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Murr et al.

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(54) **SUPPORT MEMBER FOR SUPPORTING AN ELECTRICAL CONNECTOR ON A PRINTED CIRCUIT**

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(51) **Int. Cl.**
H01R 12/00 (2006.01)

(52) **U.S. Cl.** **439/76.1**

(58) **Field of Classification Search** 439/76.1, 439/79, 540.3, 541.5; 361/752, 736
See application file for complete search history.

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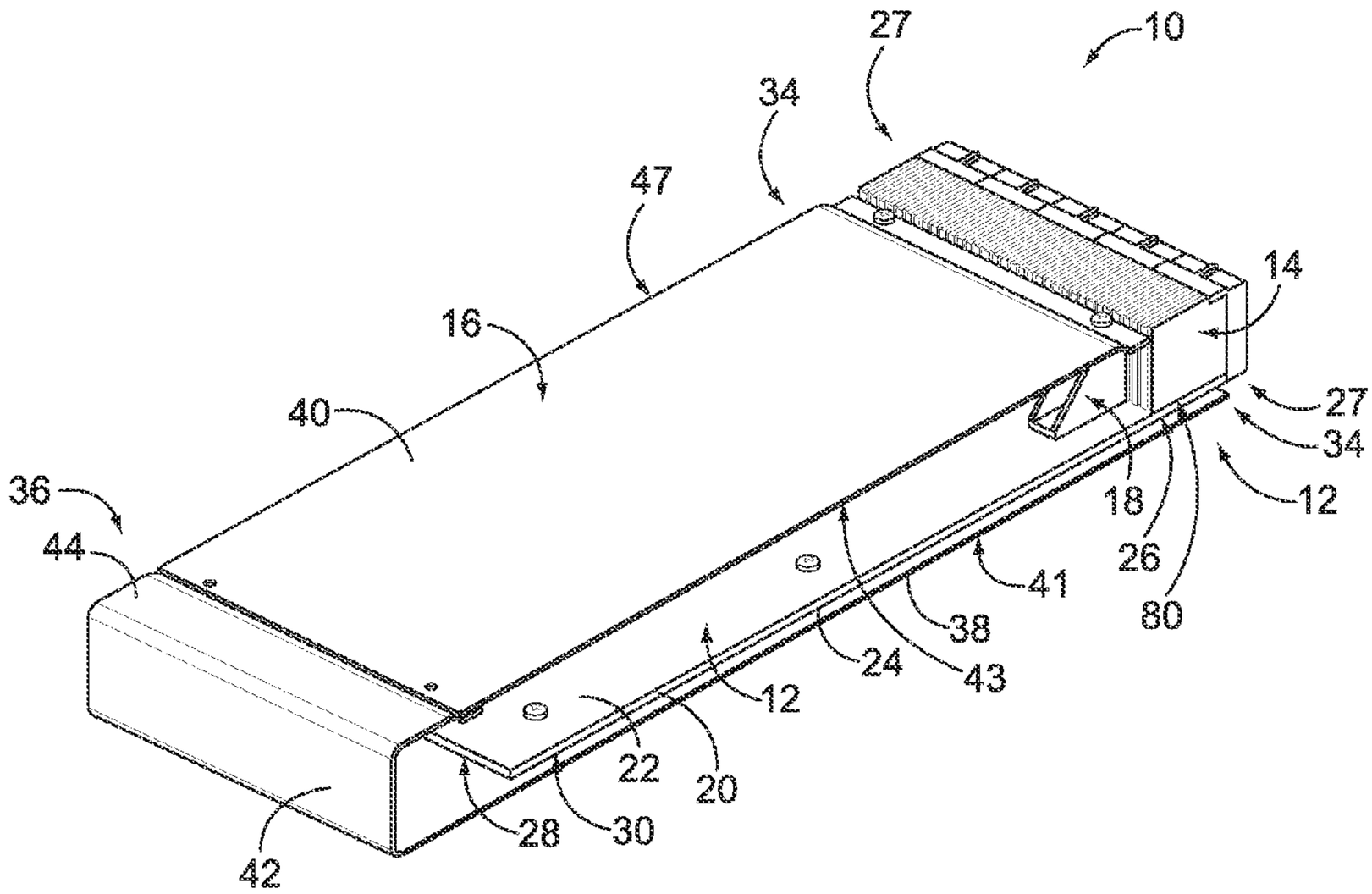
(57) **ABSTRACT**

A connector assembly includes a printed circuit having a component surface, and an electrical connector having a bottom side mounted on the component surface of the printed circuit. The electrical connector extends a length from a mating face to a rear side that is opposite the mating face. The electrical connector is configured to mate with a mating connector at the mating face. The assembly includes a support member that includes a body having a connector face and a circuit face. The support member is positioned such that the connector face engages the rear side of the electrical connector and the circuit face engages the component surface of the printed circuit to support the electrical connector on the printed circuit.

10 Claims, 11 Drawing Sheets



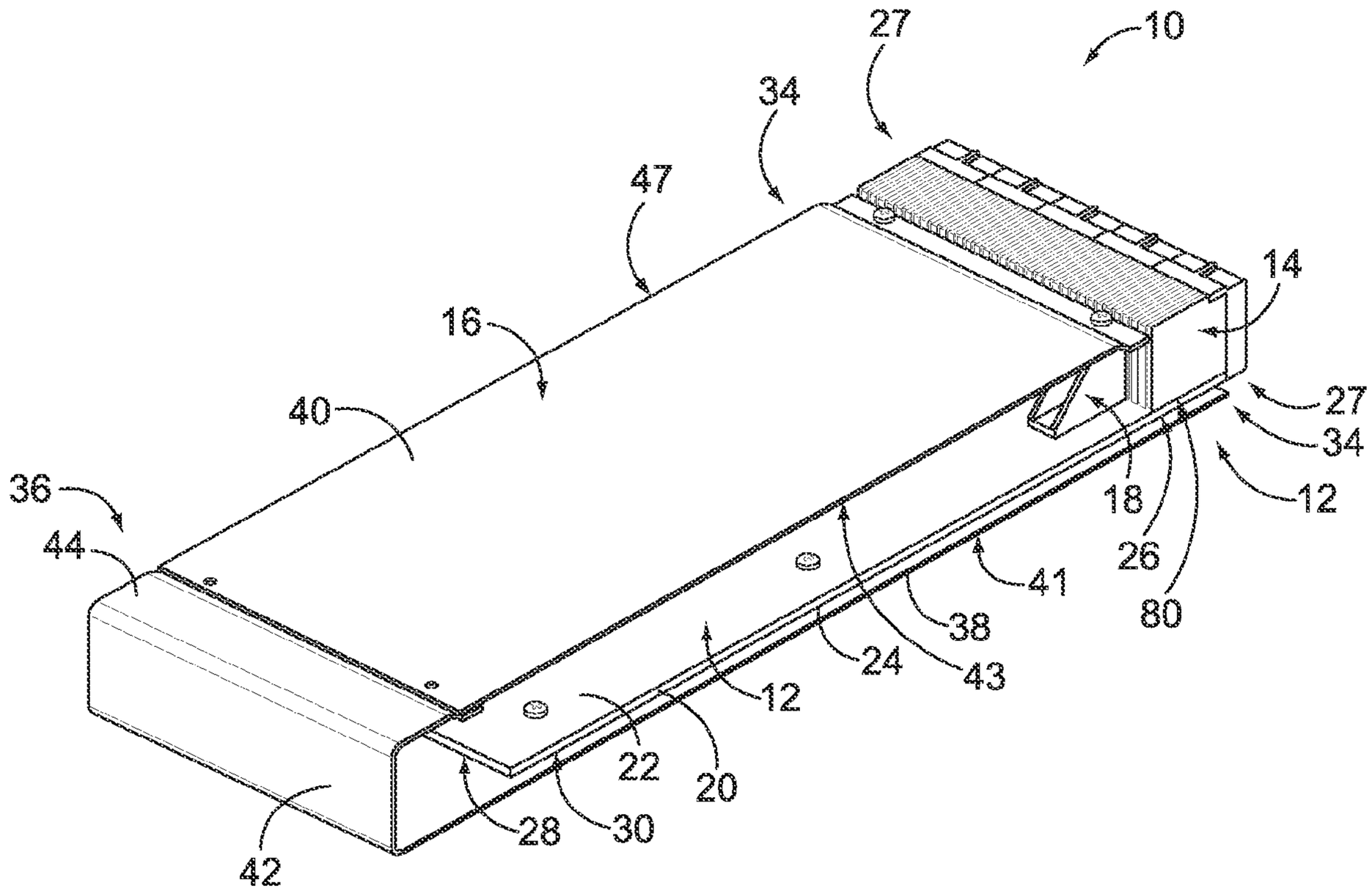

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FIG. 1

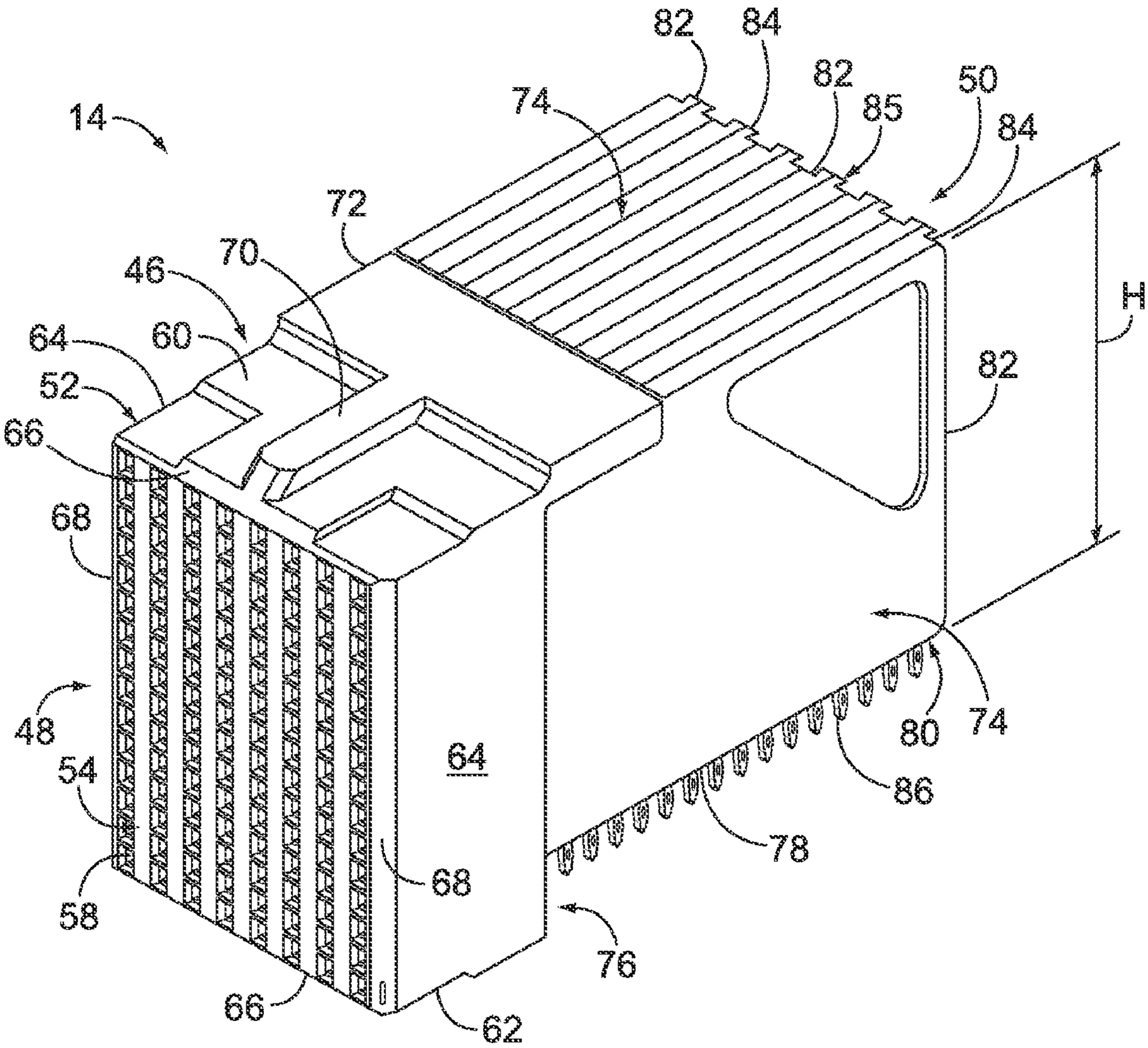
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FIG. 2

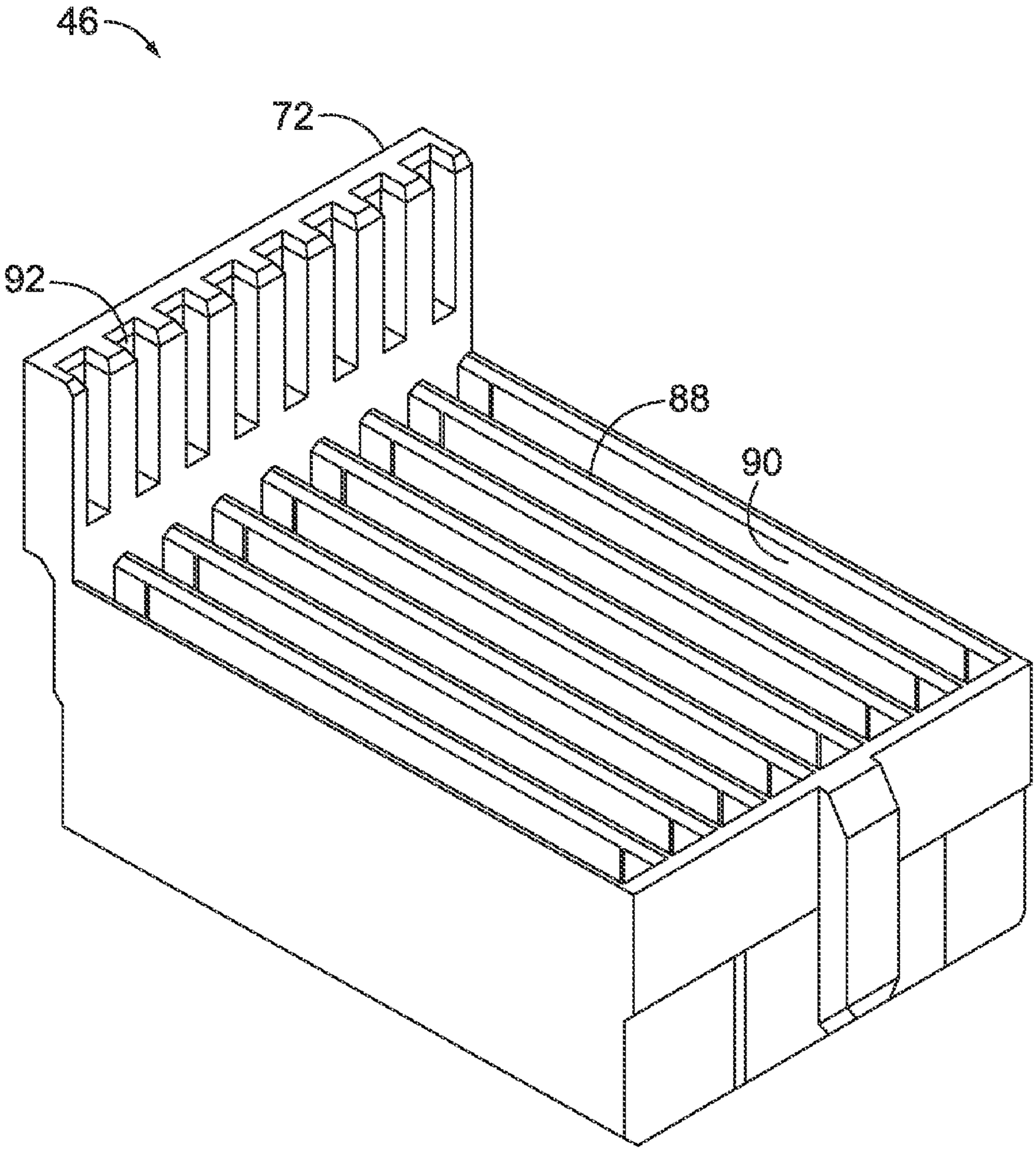

FIG. 3

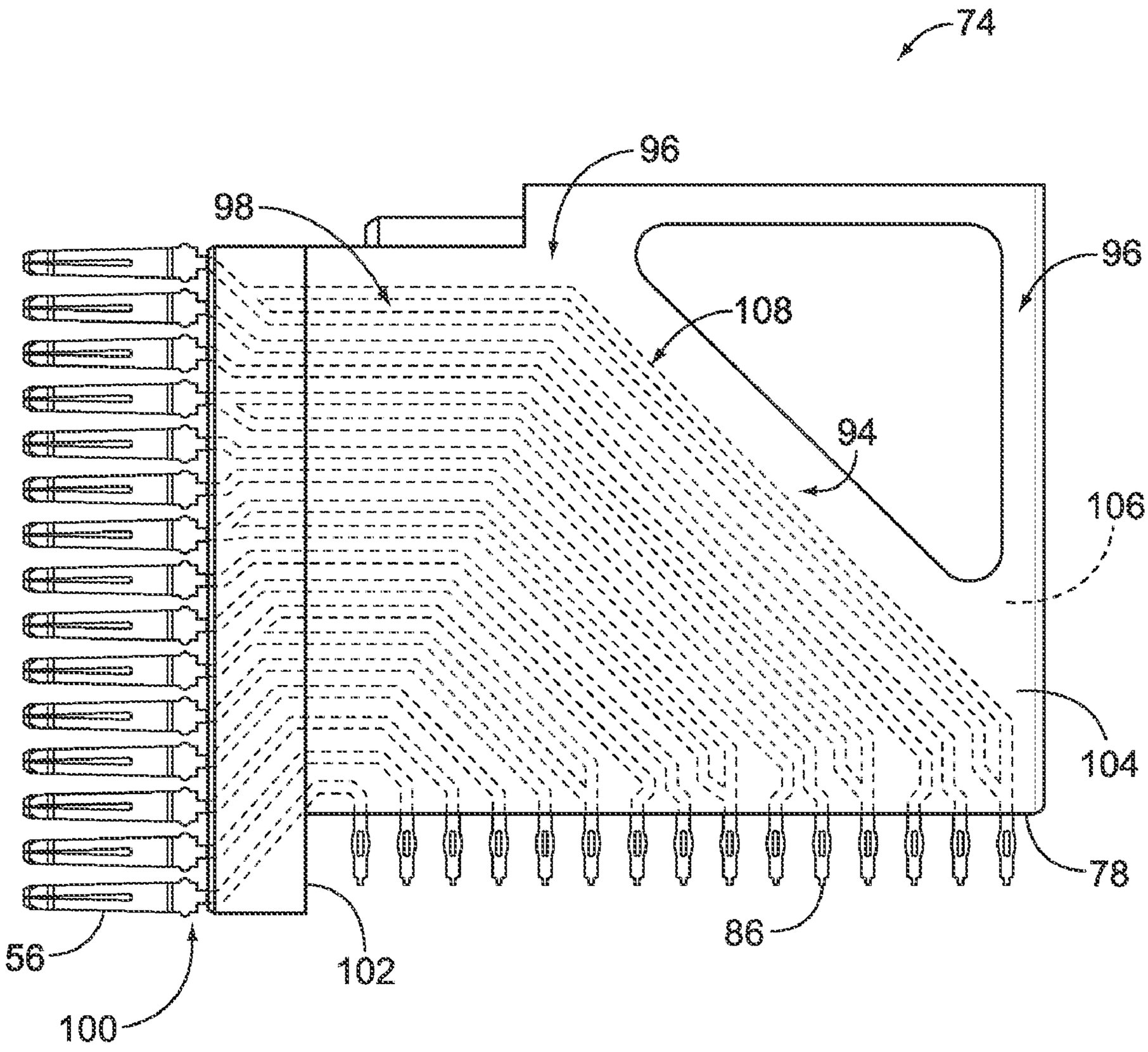

FIG. 4

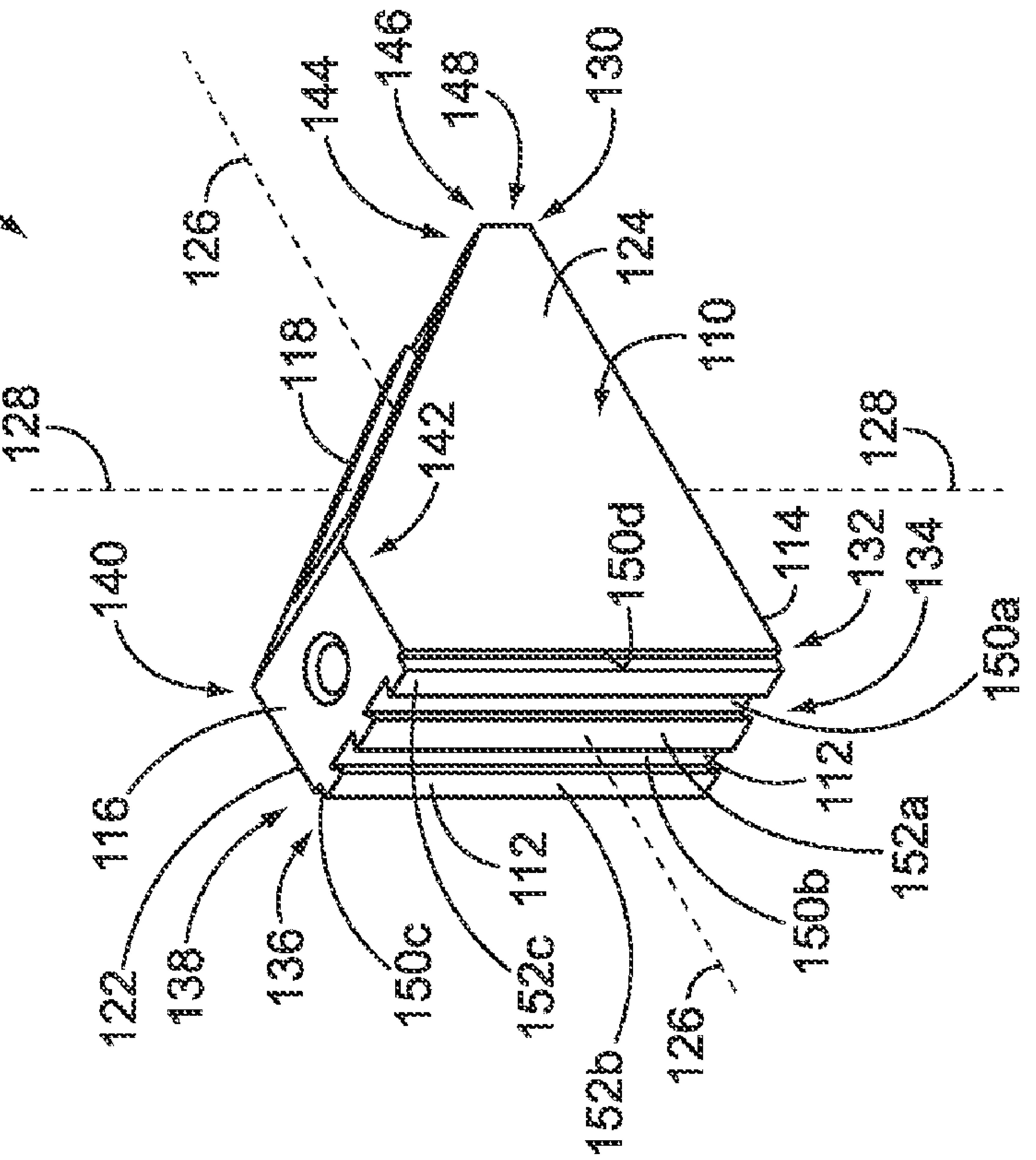
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FIG. 6

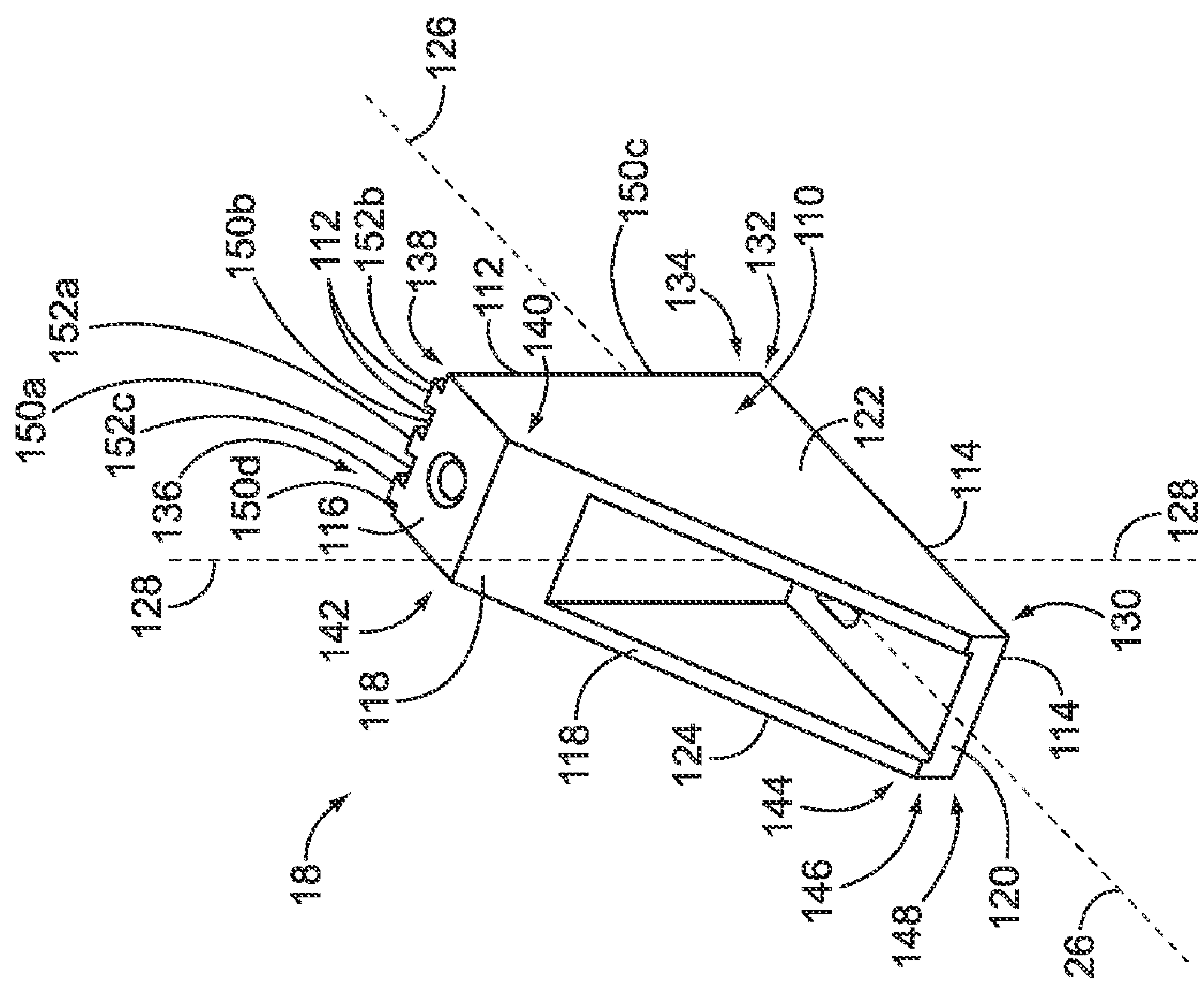
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FIG. 5

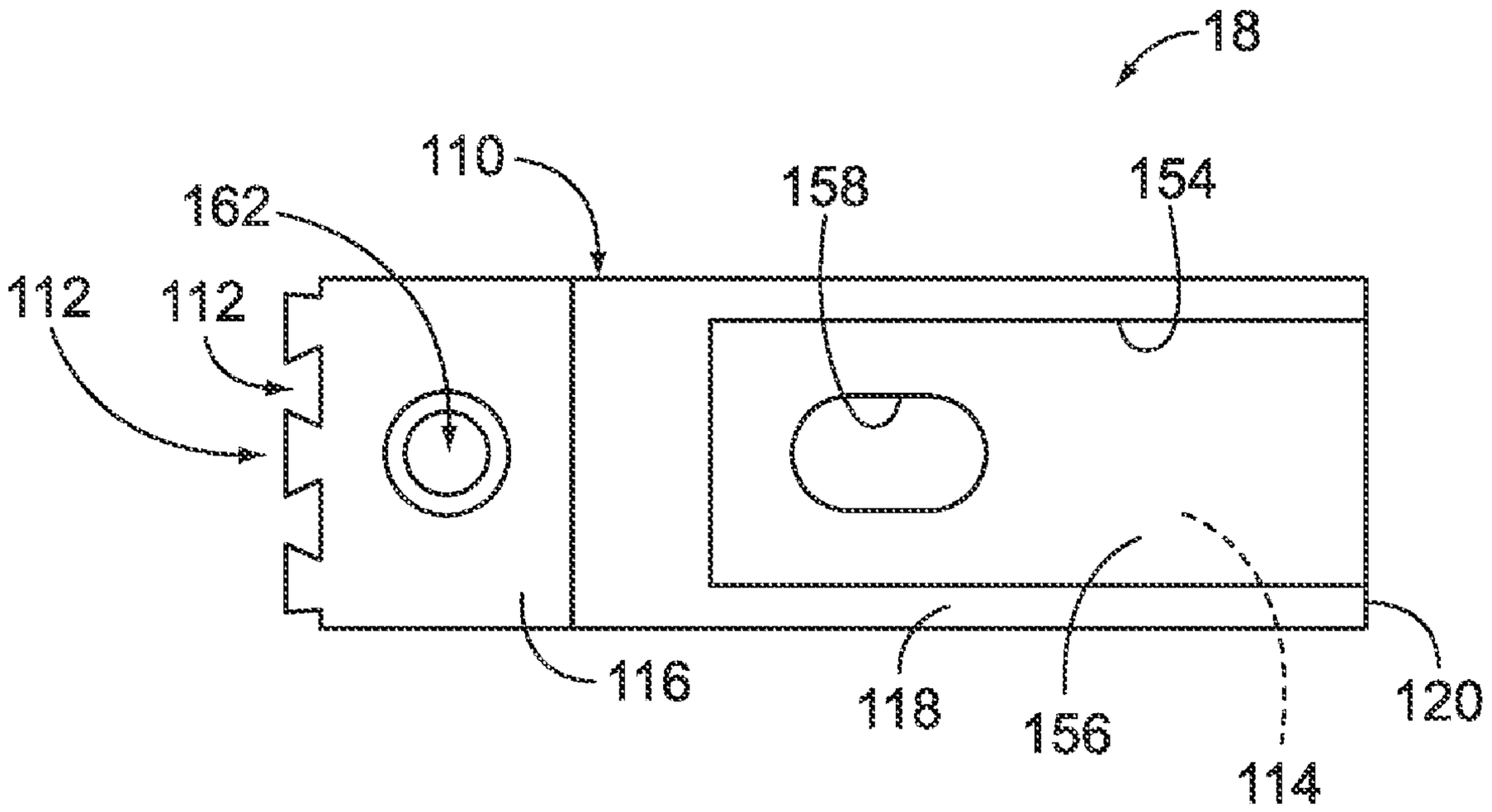
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FIG. 7

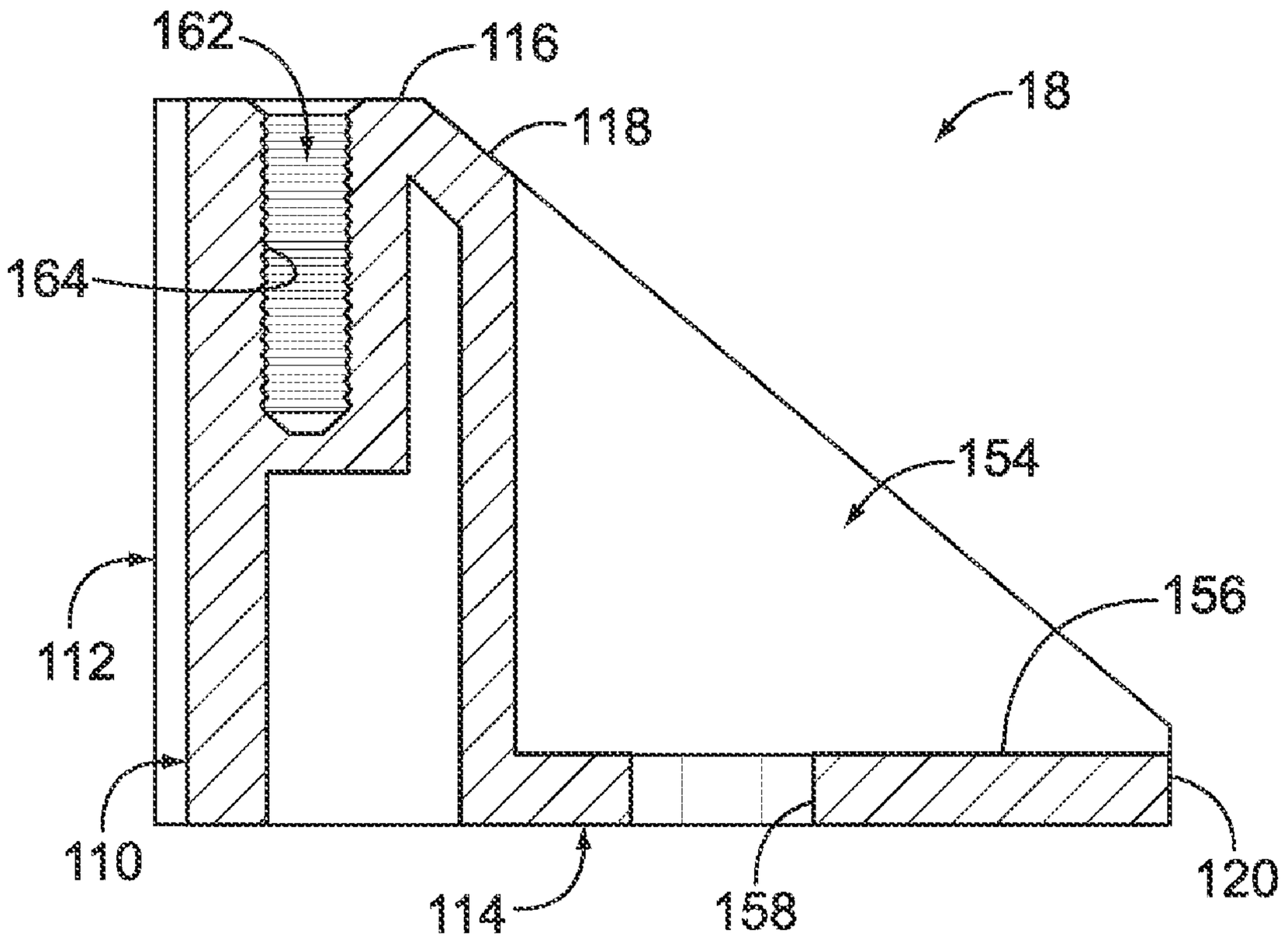
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FIG. 8

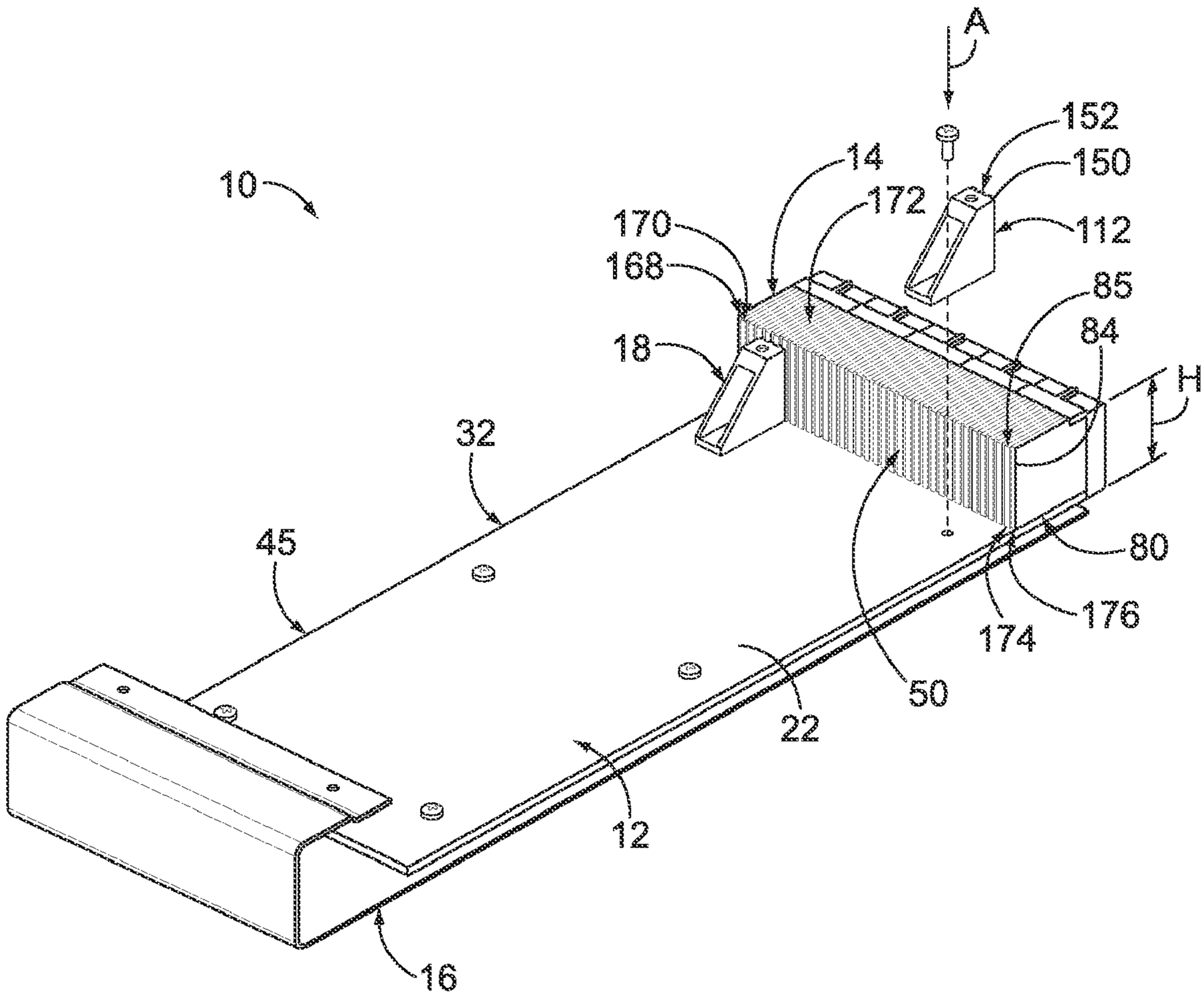
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FIG. 9

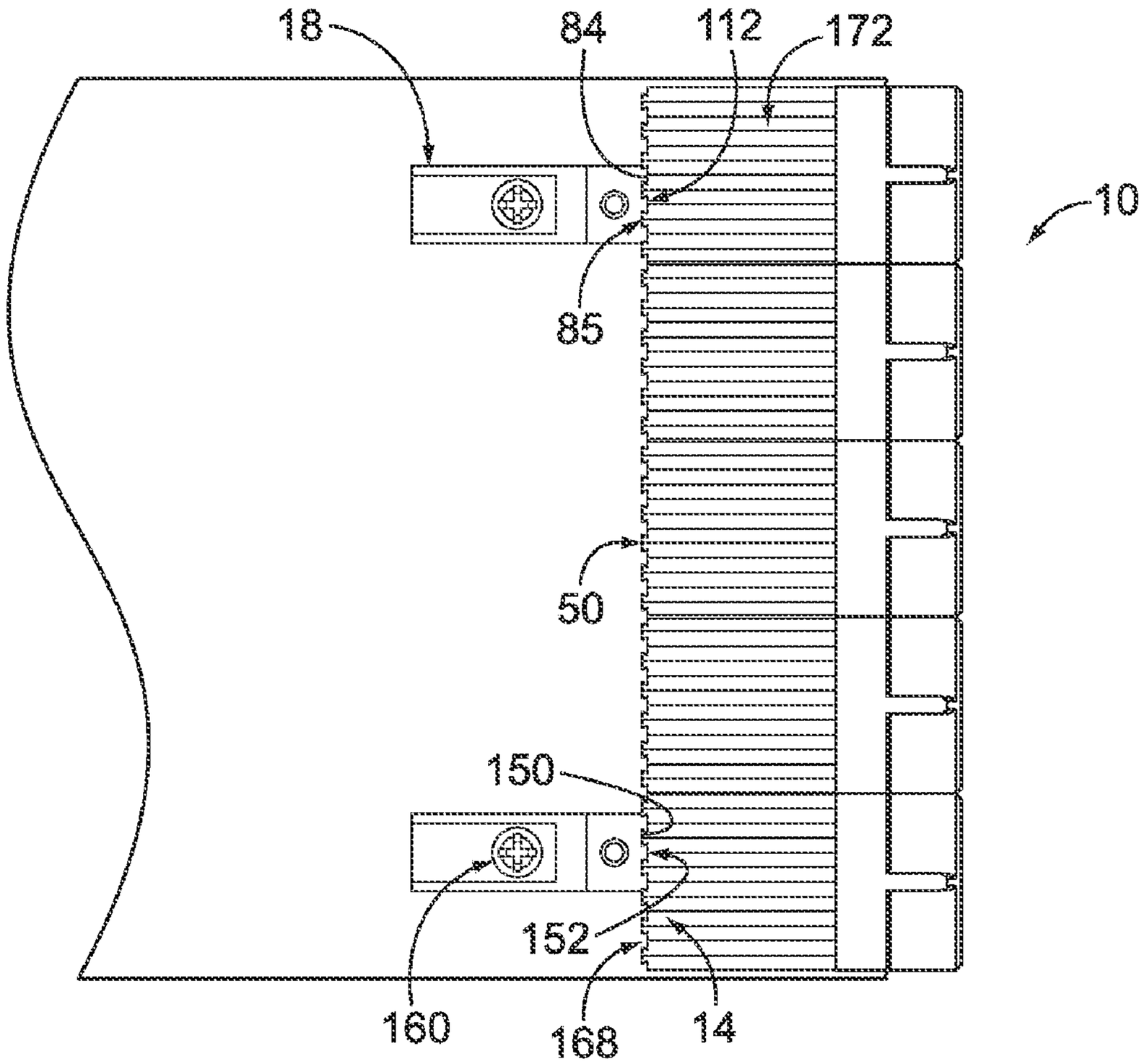
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FIG. 10

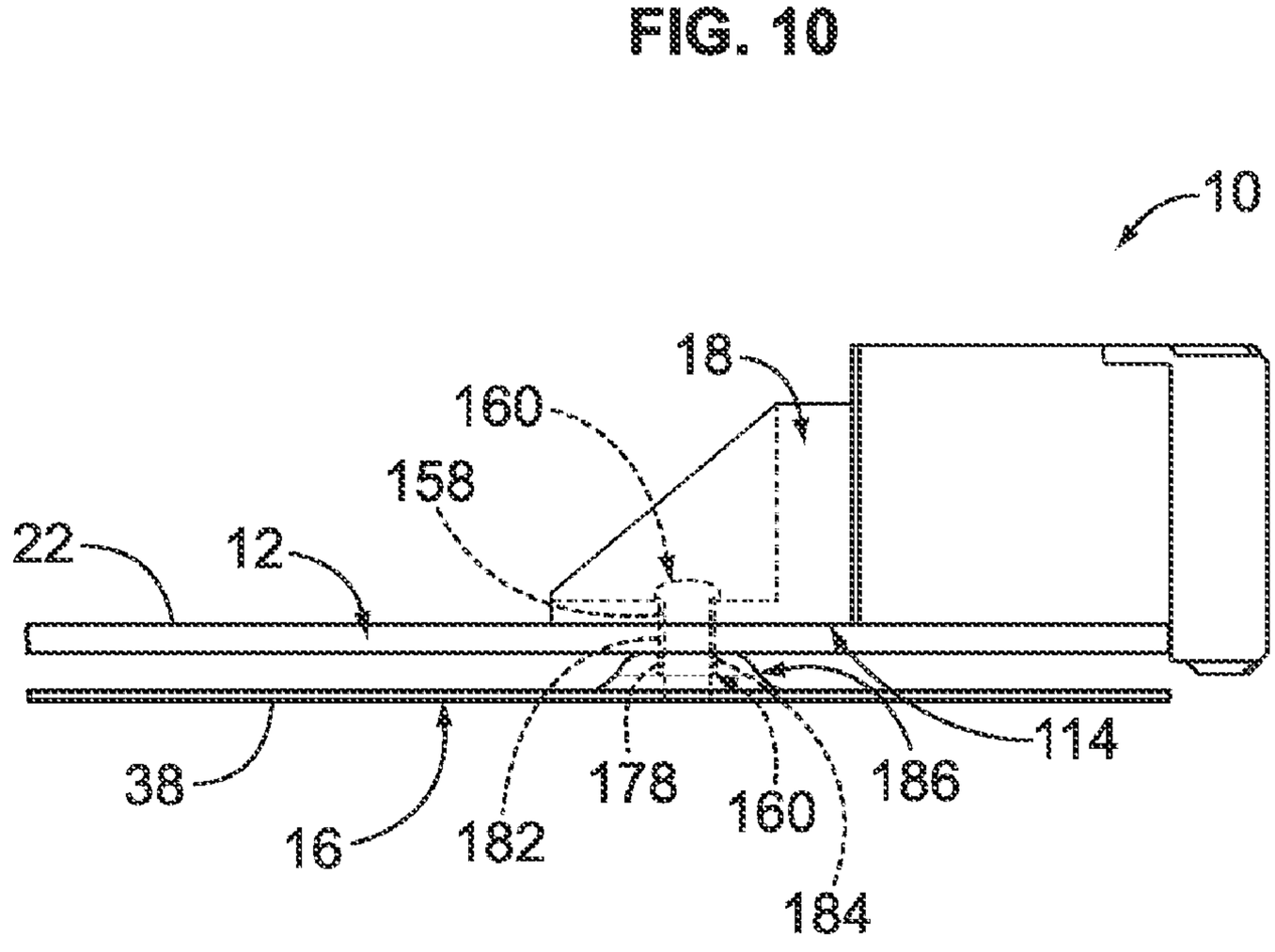
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FIG. 11

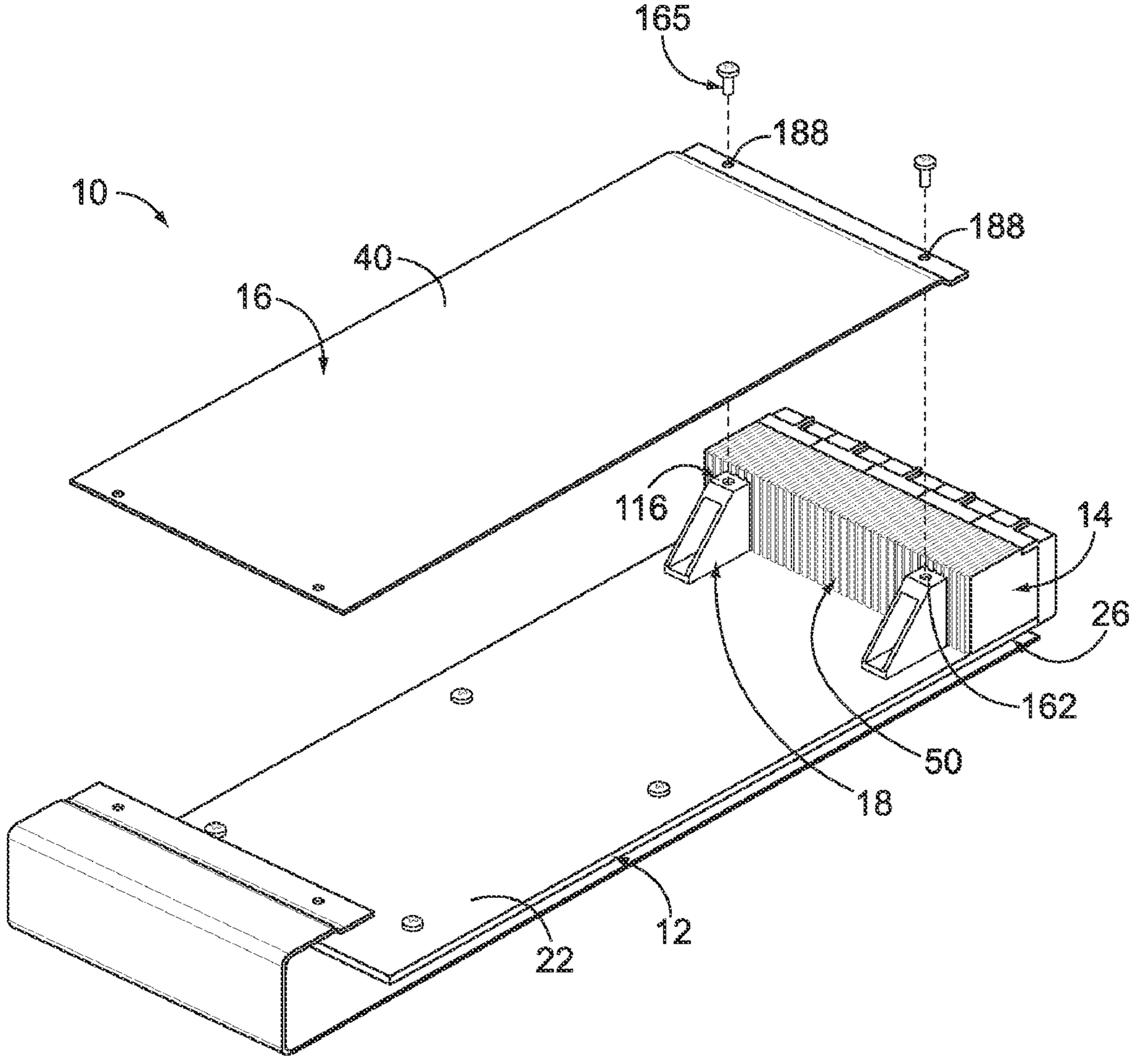

FIG. 12

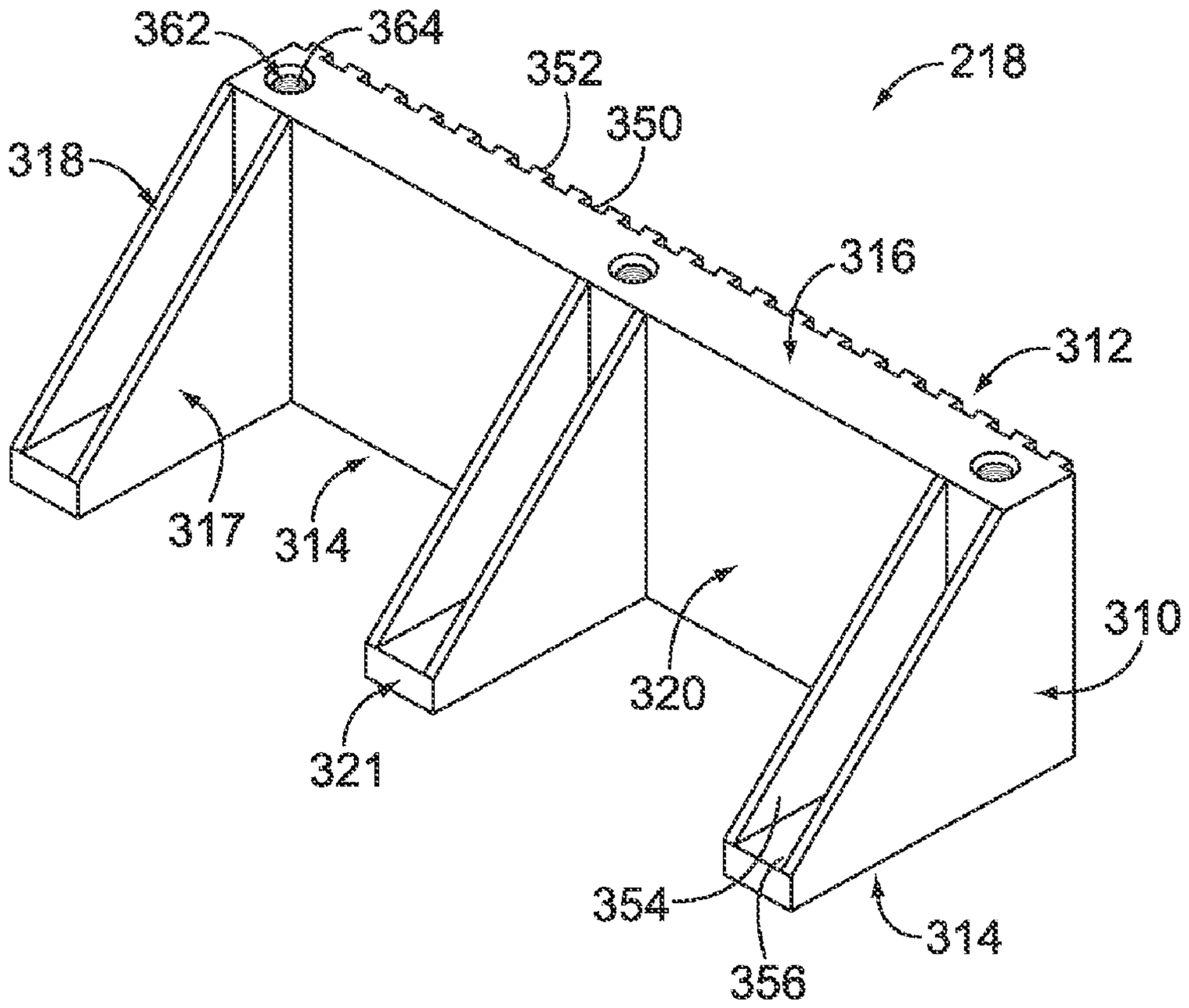
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FIG. 13

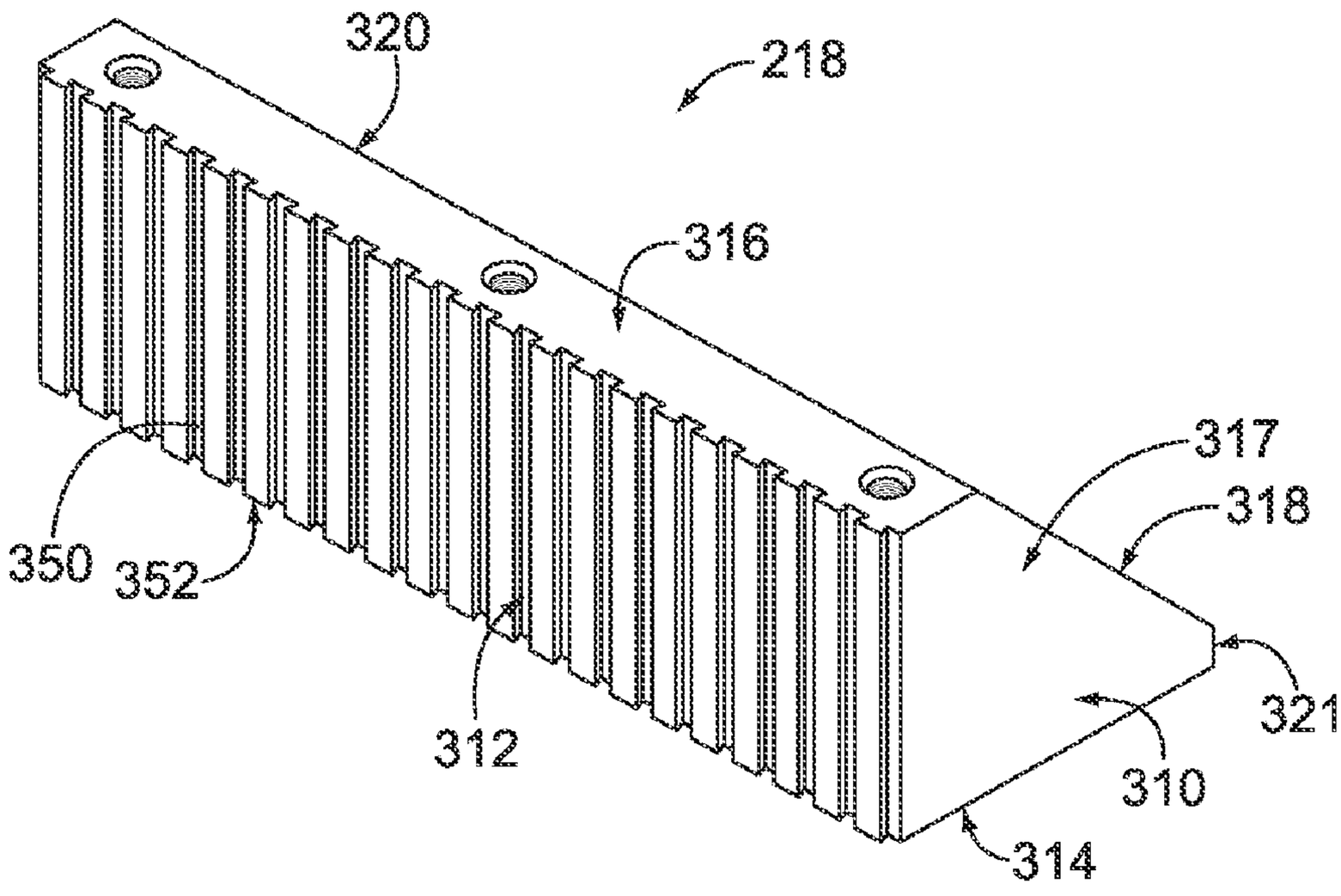
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FIG. 14

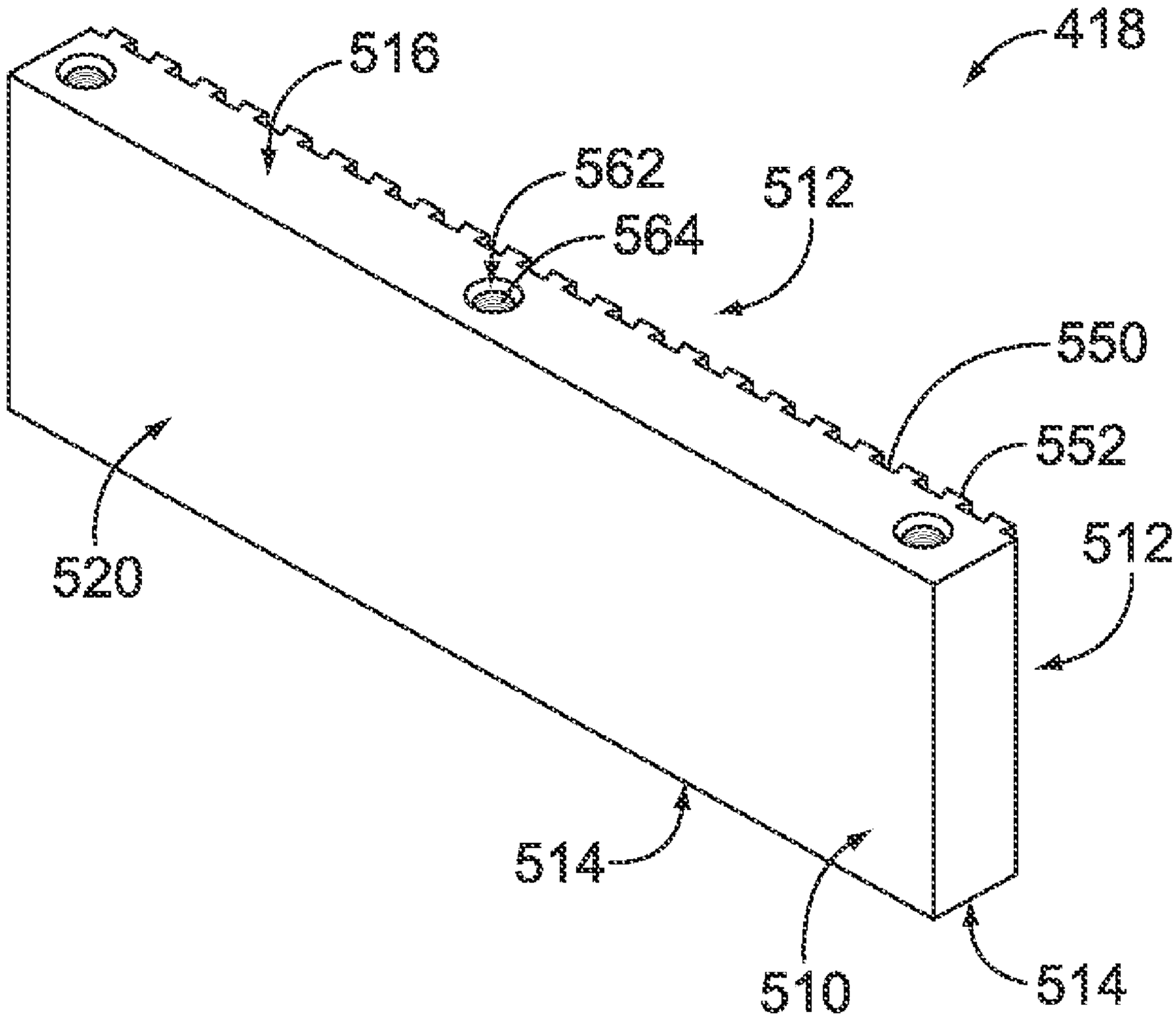

FIG. 15

SUPPORT MEMBER FOR SUPPORTING AN ELECTRICAL CONNECTOR ON A PRINTED CIRCUIT

BACKGROUND OF THE INVENTION

The subject matter described and/or illustrated herein relates generally to electrical connectors, and more particularly, to electrical connectors that are mounted on printed circuits.

Electrical connectors are commonly used to interconnect a wide variety of electrical components. Some electrical connectors are mounted on printed circuits (sometimes referred to as "circuit boards") for electrically connecting the printed circuit to another electrical component via a mating connector of the other electrical component. When the electrical connector is mated with the mating connector of the other electrical component, the printed circuit may flex and/or experience stress. For example, an insertion force required to mate the connectors together may stress the printed circuit and/or cause the printed circuit to flex during mating of the connectors. The flexing of, and/or the stresses applied to, the printed circuit may damage the printed circuit, for example causing the printed circuit to fracture, crack, and/or non-elastically deform. Flexing of the printed circuit can also dislodge the electrical connector from the printed circuit, possibly breaking one or more of the electrical connections between the electrical connector and the printed circuit.

Some known electrical connectors and printed circuits are engaged by support members that support the electrical connector and the printed circuit during mating with the mating connector. But, known support members extend along one or more sides of the electrical connector. Such known support members thereby occupy space within a mating area of the printed circuit along which the electrical connector is mounted. Mounting support members along the side of an electrical connector is an inefficient use of the limited space of the mating area of the printed circuit. For example, mounting support members along the side of an electrical connector may limit the overall number and/or size of electrical connectors that can be located along the mating area of the printed circuit.

BRIEF DESCRIPTION OF THE INVENTION

In one embodiment, a connector assembly includes a printed circuit having a component surface, and an electrical connector having a bottom side mounted on the component surface of the printed circuit. The electrical connector extends a length from a mating face to a rear side that is opposite the mating face. The electrical connector is configured to mate with a mating connector at the mating face. The assembly includes a support member that includes a body having a connector face and a circuit face. The support member is positioned such that the connector face engages the rear side of the electrical connector and the circuit face engages the component surface of the printed circuit to support the electrical connector on the printed circuit.

In another embodiment, a connector assembly includes a printed circuit having a component surface, a housing covering at least a portion of printed circuit, and an electrical connector having a bottom side mounted on the component surface of the printed circuit. The electrical connector includes a rear side extending from the bottom side. The assembly includes a support member that includes a body having a connector face and a circuit face. The support member is positioned such that the connector face engages the rear side of the connector and the circuit face engages the component surface of the printed circuit to support the electrical connector on the printed circuit.

In another embodiment, a connector assembly is provided for mounting on a printed circuit having a component surface. The assembly includes an electrical connector having a bottom side configured to be mounted on the component surface of the printed circuit. The electrical connector extends a length from a mating face to a rear side that is opposite the mating face. The electrical connector is configured to mate with a mating connector at the mating face. The assembly also includes a support member including a body having a connector face and a circuit face. The connector face is configured to engage the rear side of the electrical connector. The circuit face is oriented relative to the connector face such that the circuit face is positioned to engage the component surface of the printed circuit when the connector face is engaged with the electrical connector and the electrical connector is mounted on the printed circuit.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of an exemplary embodiment of a connector assembly.

FIG. **2** is a perspective view of an exemplary embodiment of an electrical connector of the connector assembly shown in FIG. **1**.

FIG. **3** is a perspective view of an exemplary embodiment of a housing of the electrical connector shown in FIG. **2**.

FIG. **4** is a side elevational view of an exemplary embodiment of a contact module of the electrical connector shown in FIG. **2**.

FIG. **5** is a perspective view of an exemplary embodiment of a support member of the connector assembly shown in FIG. **1**.

FIG. **6** is another perspective view of the support member shown in FIG. **5** viewed from a different angle than FIG. **5**.

FIG. **7** is a plan view of the support member shown in FIGS. **5** and **6**.

FIG. **8** is a cross-sectional view of the support member shown in FIGS. **5-7**.

FIG. **9** is a partially exploded perspective view of a portion of the connector assembly shown in FIG. **1**.

FIG. **10** is a top plan view of a portion of the connector assembly shown in FIG. **9**.

FIG. **11** is a side elevational view of the portion of the connector assembly shown in FIG. **9**.

FIG. **12** is a partially exploded perspective view of the connector assembly shown in FIG. **1**.

FIG. **13** is a perspective view of an exemplary alternative embodiment of a support member.

FIG. **14** is another perspective view of the support member shown in FIG. **13** viewed from a different angle than FIG. **13**.

FIG. **15** is a perspective view of another exemplary alternative embodiment of a support member.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** is a perspective view of an exemplary embodiment of a connector assembly **10**. The assembly **10** includes a printed circuit **12**, a plurality of electrical connectors **14**, a housing **16**, and a plurality of support members **18**. The printed circuit **12** includes a substrate **20** having a component surface **22** and a bottom surface **24** that is opposite the component surface **22**. The substrate **20** of the printed circuit **12** extends a length from a mating edge **26** to a mounting edge **28**, and extends a width from a side edge **30** to an opposite

side edge **32** (FIG. **9**). The electrical connectors **14** include bottom sides **80** that are mounted on the component surface **22** of the printed circuit **12**, in the exemplary embodiment, along the mating edge **26**. The mating edge **26** optionally defines a mating area **27** of the printed circuit **12**. The housing **16** extends a length from a connector end **34** to a mounting end **36** that is opposite the connector end **34**. The housing **16** includes a wall **38** extending along and covering the bottom surface **24** of the printed circuit **12**, a wall **40** extending along and covering the component surface **22** of the printed circuit **12**, and a rear wall **42** that intersects the walls **38** and **40**. In the exemplary embodiment, the rear wall **42** extends integrally from the wall **38** and includes a flange **44** along which the rear wall **42** is connected to the wall **40**. The housing **16** may be referred to herein as an "assembly housing".

As will be described below, the support members **18** are positioned relative to the electrical connectors **14** and the printed circuit **12** such that the support members **18** engage the electrical connectors **14** and the printed circuit **12** to support the electrical connectors **14** on the printed circuit **12**. The connector assembly **10** may be, but is not limited to being, a backplane connector assembly. In some embodiments, the mounting end **36** of the housing **16** is mounted on, and/or connected to, another structure (such as, but not limited to, a panel, a rack, a wall, and/or the like) of a larger system of which the connector assembly **10** is a component.

As used herein, the term "printed circuit" is intended to mean any electric circuit in which the conducting connections have been printed or otherwise deposited in predetermined patterns on an electrically insulating substrate. In the exemplary embodiment, each of the component surface **22** and the bottom surface **24** of the printed circuit substrate **20** include electrical conductors (not shown, such as, but not limited to, electrical contacts, electrical traces, electrical vias, and/or the like) thereon. Each of the electrical conductors on the surface **22** and the surface **24** may conduct electrical signals, electrical ground, and/or electrical power. At least some of the electrical conductors are provided along the mating edge **26** of the printed circuit **12**. Alternatively, only one of the surfaces **22** and **24** includes the electrical conductors thereon. Electrical conductors on the component surface **22** may be electrically connected to the electrical conductors on the bottom surface **22** via corresponding electrical vias (not shown) and/or electrical traces (not shown) that extend through the substrate **20**, and/or vice versa.

The geometry, size, shape, and/or the like of the printed circuit **12** shown and/or described herein is meant as exemplary only. In addition or alternative to what is shown and described herein, the printed circuit **12** may include other geometries, shapes, sizes, and/or the like. For example, although shown as having an approximately rectangular shape, the printed circuit **12** may additionally or alternatively include a circular shape, a triangular shape, and oval shape, and/or the like.

The substrate **20** of the printed circuit **12** may be a flexible substrate or a rigid substrate. The substrate **20** may be fabricated from and/or include any material(s), such as, but not limited to, ceramic, epoxy-glass, polyimide (such as, but not limited to, Kapton® and/or the like), organic material, plastic, polymer, and/or the like. In some embodiments, the substrate **20** is a rigid substrate fabricated from epoxy-glass, such that the printed circuit **12** is what is sometimes referred to as a "circuit board". In the exemplary embodiment, the substrate **20** includes only a single layer. Alternatively, the substrate **20** may include any number of layers greater than one layer. For example, the substrate **20** may include two exterior layers that each defines one of the surfaces **22** and **24**, with one or more interior layers sandwiched between the exterior layers. Each interior layer of the substrate **20** may include electrical conductors thereon. Each electrical conductor on interior layers of the substrate **20** may conduct electrical signals, electrical ground, and/or electrical power. The electrical conductors on interior layers of the substrate **20** may electrically connect some or all of the electrical conductors on the surface **22** with one or more electrical conductors on the surface **24**. In addition or alternatively, the electrical conductors on interior layers of the substrate **20** may electrically connect some or all of the electrical conductors on the surface **22** and/or the surface **24** to any other location on and/or within the substrate **20** (such as, but not limited to, any location on any layer, including the same layer, of the substrate **20**). Further, and for example, one or more layers of the substrate **20** are optionally, or optionally include, a ground plane.

Although not shown, the substrate **20** may include one or more electrical components (not shown) mounted on the surface **22**, the surface **24**, and/or an interior layer of the substrate **20**. Each of the electrical components may be active or passive. Examples of active electrical components include, but are not limited to, processors, amplifiers, and/or the like. Examples of passive electrical components include, but are not limited to, resistors, capacitors, inductors, diodes, and/or the like. Each of the electrical components may be electrically connected to one or more of the electrical conductors of the substrate **20**.

The geometry, size, shape, number of walls, and/or the like of the housing **16** shown and/or described herein is meant as exemplary only. In addition or alternative to what is shown and described herein, the housing **16** may include other geometries, shapes, sizes, number of walls, and/or the like. For example, in some alternative embodiments the housing **16** may include a side wall (not shown) that intersects edges **41** and/or **43** of the walls **38** and **40**, respectively, and/or a side wall (not shown) that intersects edges **45** (FIG. **9**) and/or **47** of the walls **38** and **40**, respectively. The housing **16** may cover any portions of the printed circuit **12**. For example, the walls **38**, **40**, and **42** of the housing **16** may each cover and/or extend along less of the printed circuit **12** than is shown and/or described herein. Moreover, and for example, the walls **38**, **40**, and **42** of the housing **16** may each cover and/or extend along different portions of the printed circuit **12** than the portions shown and/or described herein. The housing **16** may be fabricated from any materials. In the exemplary embodiment, the housing **16** is fabricated from one or more electrically conductive materials, such as, but not limited to, a metal and/or the like. In addition or alternatively, the housing **16** is fabricated from one or more dielectric materials.

FIG. **2** is a perspective view of an exemplary embodiment of one of the electrical connectors **14**. The electrical connector **14** includes a dielectric housing **46**. The electrical connector **14** extends a length from a forward mating end **48** of the housing **46** to a rear side **50**. The mating end **48** includes a shroud **52** and a mating face **54**. The mating face **54** includes a plurality of mating contacts **56** (FIG. **4**), such as, for example, contacts within contact cavities **58** that are configured to receive corresponding mating contacts (not shown) from a mating connector (not shown). The shroud **52** includes an upper surface **60** and a lower surface **62** between opposed sides **64**. The upper and lower surfaces **60** and **62**, respectively, each include an optional chamfered forward edge portion **66**. The sides **64** each include optional chamfered side edge portions **68**. An optional alignment rib **70** is formed on the upper shroud surface **60** and lower shroud surface **62**. The chamfered edge portions **66** and **68** and the alignment rib **70** cooperate to bring the electrical connector **14** into alignment

with the mating connector during the mating process so that the contacts in the mating connector are received in the contact cavities **58** without damage. The housing **46** may be referred to herein as a "connector housing".

The housing **46** also includes a rearwardly extending hood **72**. A plurality of contact modules **74** are received in the housing **46** from a rear end **76** of the housing **46**. Bottom walls **78** of the contact modules **74** define a portion of a bottom side **80** of the electrical connector **14**. Rear walls **82** of the contact modules **74** define the rear side **50** of the electrical connector **14**. Although twelve are shown, each electrical connector **14** may include any number of the contact modules **74**.

The rear side **50** of the electrical connector **14** includes one or more optional slots **84** and one or more optional extension elements **85** for connection with the support member **18**. In the exemplary embodiment, each of the slots **84** and each of the extension elements **85** extends along an approximate entirety of the height H of the rear side **50** of the electrical connector **14**, which is best seen in FIG. **9**. Alternatively, one or more of the slots **84** and/or one or more of the extension elements **85** extends along only a portion of the height H of the rear side **50** of the electrical connector **14**. As can be seen in FIG. **2**, each of the slots **84** and each of the extension elements **85** is defined by the rear walls **82** of two adjacent contact modules **74**. In other words, the rear wall **82** of each contact module **74** includes approximately half of one of the slots **84** and approximately half of one of the extension elements **85**. Alternatively, the rear wall **82** of one or more of the contact modules **74** may include one or more entire slots **84** and/or one or more entire extension elements **85** (whether or not the rear wall **82** includes any partial slots **84** and/or partial extension elements **85**). Moreover, in some alternative embodiments, the rear wall **82** of one or more of the contact modules **74** includes less and/or more than approximately half of one or more of the slots **84** and/or one or more of the extension elements **85** (whether or not the rear wall **82** includes any entire slots **84** and/or entire extension elements **85**).

In the exemplary embodiment, each of the slots **84** and each of the extension elements **85** includes a wedge shape. But, in addition or alternatively to the exemplary shapes shown and/or described herein, each of the slots **84** may include any other shape. Each of the extension elements **85** may also include any other shape than is shown and/or described herein. Although four extension elements **85** are shown, the rear side **50** of each electrical connector **14** may include any number of entire extension elements **85** and any number of partial extension elements **85**. Similarly, although three entire slots **84** and two half slots **84** are shown, the rear side **50** of each electrical connector **14** may include any number of entire slots **84** and any number of partial slots **84**.

The bottom side **80** of the electrical connector **14** extends from the rear side **50** and includes a plurality of mounting contacts **86** that are configured to be mounted to the printed circuit **12** (FIGS. **1** and **9-11**). In the exemplary embodiment, the mounting contacts **86** are press-fit contacts, specifically eye-of-the-needle contacts. One or more of the mounting contacts **86** may alternatively be another type of contact, such as, but not limited to, pin contacts, solder tail contacts, other press-fit contacts, surface mount contacts, and/or the like. In the exemplary embodiment, the bottom side **80** of the electrical connector **14**, and thus the component surface of the printed circuit **12**, is approximately perpendicular to the mating face **54**. The electrical connector **14** thereby interconnects the printed circuit **12** with the mating connector at approximately a right angle relative to each other, in the exemplary embodiment. Alternatively, the bottom side **80** extends at any other angle relative to the mating face **54** for interconnecting the printed circuit **12** with the mating connector at any other angle relative to each other than a right angle, such as, but not limited to, approximately parallel.

FIG. **3** is a perspective view of an exemplary embodiment of the housing **46** of the electrical connector **14** (FIGS. **1**, **2**, **9**, and **10**). The housing **46** includes a plurality of dividing walls **88** that define a plurality of chambers **90**. The chambers **90** receive a forward portion of the contact modules **74** (FIGS. **2** and **4**) therein. A plurality of slots **92** are formed in the hood **72**. The chambers **90** and the slots **92** cooperate to stabilize the contact modules **74** when the contact modules **74** are loaded into the housing **46**. In the exemplary embodiment, the slots **92** each have an approximately equal width. However, some or all of the slots **92** may different widths for accommodating differently sized contact modules **74**. The chambers **90** and the slots **92** optionally extend substantially an entire length of the contact modules **74** such that the walls **88** separate adjacent contact modules **74**.

FIG. **4** is a side elevational view of an exemplary embodiment of a contact module **74** of the electrical connector **14** (FIGS. **1**, **2**, **9**, and **10**). The contact module **74** includes an internal lead frame **94**, shown in phantom outline, and a dielectric body **96**. The lead frame **94** includes a plurality of terminals **98** enclosed within the body **96**. The mating contacts **56** extend from a mating edge portion **100** of the body **96** and the mounting contacts **86** extend from the bottom wall **78** of the body **96**. The bottom wall **78** intersects with a rearward facing end wall **102** proximate the mating edge portion **100**. Alternatively, the mating edge portion **100** may intersect the bottom wall **78**. The body **96** includes opposite sides **104** and **106** that, in the exemplary embodiment, extend substantially parallel to and along the lead frame **94**. In the exemplary embodiment, the mating edge portion **100** and the bottom wall **78** extend approximately perpendicular to each other. However, the mating edge portion **100** and the bottom wall **78** may extend any direction relative to each other, such as, but not limited to, approximately parallel.

The terminals **98** include the mating and mounting contacts **56** and **86**, respectively, and an intermediate terminal portion **108**, which extends between the mating and mounting contacts **56** and **86**, respectively. The intermediate terminal portions **108** extend along predetermined paths to electrically connect each mating contact **56** to a corresponding mounting contact **86**. In some embodiments, the intermediate terminal portion **108** extends obliquely between the mating and mounting contacts **56** and **86**, respectively. For example, in the exemplary embodiment, portions of the intermediate terminal portions **108** extend at approximately a forty-five degree angle between the mating and mounting contacts **56** and **86**, respectively.

Each of the terminals **98** of the contact module **74** may transmit electrical signals, electrical power, or electrical ground. The contact module **74** may include any number of terminals **98**, any number of which may be selected as electrical signal terminals, electrical power terminals, and electrical ground terminals according the desired wiring pattern of the contact module **74**. Optionally, adjacent electrical signal terminals may function as differential pairs, and each differential pair may optionally be separated by an electrical ground terminal. The contact module **74** may include any number of the mating contacts **56** and any number of the mounting contacts **86**.

In alternative embodiments, at least a portion of the intermediate terminal portion **108** of one or more of the terminals **98** may be removed such that the intermediate terminal portion **108** does not connect the corresponding mating and

mounting contacts **56** and **86**, respectively, of the terminal **98**. In such an embodiment wherein at least a portion of one or more of the intermediate terminal portions **108** is removed, a commoning member (not shown) may be employed to electrically connect the corresponding mating and mounting contacts **56** and **86**, respectively.

FIG. **5** is a perspective view of an exemplary embodiment of one of the support members **18**. FIG. **6** is another perspective view of the support member **18** viewed from a different angle than FIG. **5**. Referring now to FIGS. **5** and **6**, the support member **18** includes a body **110** having a connector face **112**, a circuit face **114**, a housing face **116**, an intermediate face **118**, and a rear face **120**. A pair of opposite side faces **122** and **124** extend between the faces **112**, **114**, **116**, **118**, and **120** at opposite sides thereof. As will be described below, the connector face **112** is configured to engage the rear side **50** (FIGS. **2**, **9**, and **10**) of the electrical connector **14** (FIGS. **1**, **2**, **9**, and **10**), and the circuit face **114** is configured to engage the component surface **22** (FIGS. **1**, **9**, and **11**) of the printed circuit **12** (FIGS. **1**, **9**, and **11**).

The body **110** extends a length along a central longitudinal axis **126**, and extends a height along a central axis **128**. The circuit face **114** extends a length along the length of the body **110** from an end **130** to an opposite end **132**. The connector face **112** extends a length from the end **132** of the circuit face **114** along the height of the body **110**. The connector face **112** extends the length from an end **134** that intersects the end **132** of the circuit face **114** to an opposite end **136**. In the exemplary embodiment, the lengths of the connector face **112** and the circuit face **114** extend approximately perpendicular to each other. The housing face **116** extends a length from the end **136** of the connector face **112** along a portion of the length of the body **110**. The housing face **116** extends the length from an end **138** that intersects the end **136** of the connector face **112** to an opposite end **140**. In the exemplary embodiment, the length of the housing face **116** extends approximately perpendicular to the length of the connector face **112** and approximately parallel to the length of the circuit face **114**.

The intermediate face **118** extends a length from the housing face **116** to the rear face **120**. The intermediate face **118** extends the length from an end **142** that intersects the end **140** of the housing face **116** to an opposite end **144**. The rear face **120** extends a length from the end **144** of the intermediate face **118** along the height of the body **110**. The rear face **120** extends the length from an end **146** that intersects the end **144** of the intermediate face **118** to an opposite end **148** that intersects the end **130** of the circuit face **114**. In the exemplary embodiment, the length of the rear face **120** extends approximately perpendicular to the lengths of the circuit face **114** and the housing face **116**, and extends approximately parallel to the length of the connector face **112**. In the exemplary embodiment, the length of the intermediate face **118** extends at an approximately 135° angle relative to the housing face **116** and the rear face **120**, and thus extends at an approximately 45° angle relative to the connector face **112** and the circuit face **114**.

The connector face **112** of the body **110** of the support member **18** includes one or more optional slots **150** for connection with the electrical connector **14**. The slots **150** define optional extension elements **152** therebetween. In the exemplary embodiment, the body **110** includes four slots **150**, namely, two interior slots **150***a* and **150***b* and two exterior slots **150***c* and **150***d*. The interior slots **150***a* and **150***b* are spaced apart from each other by an extension element **152***a*. The exterior slot **150***c* is spaced apart from the interior slot **150***b* by an extension element **152***b*, and the exterior slot **150***d* is spaced apart from the interior slot **150***a* by an extension element **152***c*. In the exemplary embodiment, each of the slots **150** and each of the extension elements **152** extends along an approximate entirety of the length of the connector face **112**. Alternatively, one or more of the slots **150** and/or one or more of the extension elements **152** extends along only a portion of the length of the connector face **112**.

In the exemplary embodiment, the interior slots **150***a* and **150***b* each include a wedge shape, while the exterior slots **150***c* and **150***d* each include a right-angle shape. But, in addition or alternatively to the exemplary shapes shown and/or described herein, each of the slots **150** may include any other shape. Each of the extension elements **152** may also include any other shape than is shown and/or described herein. One or more of the slots **150** optionally includes a complementary shape relative to a corresponding one of the extension elements **85** (FIGS. **2**, **9**, and **10**) of the electrical connector **14**. Similarly, one or more of the extension elements **152** optionally includes a complementary shape relative to a corresponding one of the slots **84** (FIGS. **2**, **9**, and **10**) of the electrical connector **14**. Although four slots **150** and three extension elements **152** are shown, the connector face **112** may include any number of the slots **150** and any number of the extension elements **152**.

FIG. **7** is a plan view of the support member **18**. FIG. **8** is a cross-sectional view of the support member **18**. Referring now to FIGS. **7** and **8**, the intermediate face **118** includes an optional recess **154** extending therethrough. The recess **154** optionally extends through a portion of the rear face **120**, as best seen in FIG. **5**. The recess **154** includes a bottom **156**. One or more optional openings **158** extend through the bottom **156** of the recess **154**, through the circuit face **114**, and completely through the body **110** between the bottom **156** and the circuit face **114**. The opening **158** is configured to receive a fastener **160** (FIGS. **10** and **11**) therethrough for connecting the support member **18** to the wall **38** (FIGS. **1** and **11**) of the housing **16** (FIGS. **1**, **9**, **11**, and **12**) of the electrical connector **14**. Optionally, the body **110** of the support member **18** does not include the recess **154** and the opening **158** extends through the intermediate face **118**.

The support member **18** includes one or more optional openings **162** that extend through the housing face **116** and into a portion of the body **110**. In the exemplary embodiment, the opening **162** includes a thread **164** for connection to the housing **16** using a threaded fastener **165** (FIG. **12**). In some alternative embodiments, the opening **162** extends completely through the body **110** for connecting the support member **18** to the wall **38** of the housing **16** using a fastener (not shown) that extends through the opening **162**. The connection between the support member **18** and the wall **38** of the housing **16** using the opening **162** may be an additional or alternative connection to any connection between the support member **18** and the wall **38** described and/or illustrated herein, such as, but not limited to, to the connection between the support member **18** and the wall **38** using the opening **158**.

In addition or alternatively to the exemplary sizes and shapes shown and/or described herein, the body **110** of the support member **18** may include any other shapes that enable the body **110** to engage both the component surface **22** (FIGS. **1**, **9**, and **11**) of the printed circuit **12** and the rear side **50** of the electrical connector **14**. For example, the lengths of the connector face **112** and the circuit face **114** may extend at any other angle than approximately perpendicular relative to each other. Moreover, and for example, the length of the housing face **116** may extend at any other angle than approximately perpendicular relative to the length of the connector face **112**; and the length of the housing face **116** may extend at any other

angle than approximately parallel relative to the length of the circuit face **114**. Further, and for example, the length of the rear face **120** may extend at any other angle than approximately perpendicular relative to the lengths of the circuit face **114** and/or the housing face **116**; and the length of the rear face **120** may extend at any other angle than approximately parallel relative to the length of the connector face **112**. Yet another example is that the length of the intermediate face **118** may extend at any other angle than approximately 135° relative to the housing face **116** and/or the rear face **120**; and the length of the intermediate face **118** may extend at any other angle than approximately 45° relative to the connector face **112** and/or the circuit face **114**. In some alternative embodiments, the housing face **116** intersects the rear face **120**. For example, the body **110** of the support member **18** optionally does not include the intermediate face **118**, or both the intermediate face **118** and the housing face **116** intersect the rear face **120**. In some alternative embodiments, the body **110** of the support member **18** optionally does not include the rear face **120** and the circuit face **114** intersects the intermediate face **118** and/or the housing face **116**.

The body **110** of the support member **18** may be fabricated from any materials. In the exemplary embodiment, the body **110** is fabricated from one or more dielectric materials, such as, but not limited to, a plastic, a polymer, and/or the like. In addition or alternatively, the body **110** may be fabricated from one or more electrically conductive materials and/or may include one or more electrical conductors thereon and/or therein. For example, in some alternative embodiments, the body **110** and/or one or more electrical conductors on and/or within the body **110** may provide an electrical connection between one or more of the electrical connectors **14** and the printed circuit **12**.

FIG. **9** is a partially exploded perspective view of a portion of the connector assembly **10**. The wall **40** of the housing **16** has been removed from the assembly **10** in FIG. **9** for clarity. FIG. **9** illustrates assembly of the support members **18** with the electrical connectors **14**, the printed circuit **12**, and the housing **16**. The bottom side **80** of each of the electrical connectors **14** is mounted on the component surface **22** of the printed circuit **12**. The slots **84** and the extension elements **85** of the electrical connectors **14** extend upward from the printed circuit **12**. In the exemplary embodiment, each of the slots **84** and each of the extension elements **85** extends along an approximate entirety of the height H of the rear side **50** of the electrical connector **14**. In other words, each slot **84** and extension element **85** extends from a respective top **168** and **170** that intersects a top side **172** of the electrical connector(s) **14** to a respective bottom **174** and **176** that intersects the component surface **22** of the printed circuit **12**. In alternative embodiments wherein the respective bottom **174** and/or **176** of one or more of the slots **84** and/or one or more of the extension elements **85** does not intersect that components surface **22**, the slot(s) **84** and/or the extension element(s) **85** are still considered to extend upwardly from the printed circuit **12**.

FIG. **10** is a top plan view of a portion of the assembly **10**. Referring now to FIGS. **9** and **10**, to assemble the support members **18** with the electrical connectors **14**, each of the extension elements **152** of the support members **18** is slidably received within a corresponding one of the slots **84** of the electrical connectors **14**. Similarly, some of the extension elements **85** of the electrical connectors **14** are slidably received within corresponding ones of the slots **150** of the support members **18**. Via the reception of the extension elements **152** and **85** within the respective slots **84** and **150**, the connector faces **112** of the support members **18** are thereby engaged with the rear sides **50** of the electrical connectors **14**. In the exemplary embodiment, the extension elements **152** of the support members **18** are loaded into the slots **84** of the electrical connectors **14** from the top **168** in the direction of the arrow A (not shown in FIG. **10**). But, in alternative embodiments wherein the top **168** of one or more of the slots **84** does not intersect the top side **172** of the corresponding electrical connector(s) **14**, the extension elements **152** of one or more of the support members **18** may need to be loaded from the bottom **174** (not visible in FIG. **10**) of the slots **84** before the corresponding electrical connector(s) **14** is mounted on the printed circuit **12**.

In addition or alternative to the reception of the extension elements **85** and **152** within the respective slots **150** and **84**, one or more of the connector faces **112** is optionally mechanically connected to the corresponding rear side(s) **50** using any connection element (not shown), such as, but not limited to, an adhesive, a threaded fastener, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, one or more of the connector faces **112** is engaged with the corresponding rear side(s) **50** in alternative to the slots **84** and **150**, the extension elements **85** and **152**, and the connection elements. In other words, in some embodiments the engagement between one or more of the connector faces **112** and the rear side **50** of the electrical connector(s) **14** is the only mechanical connection between the connector face(s) **112** and the rear side(s) **50** of the electrical connector(s) **14**.

FIG. **11** is a side elevational view of the portion of the connector assembly **10** shown in FIG. **9**. The circuit face **114** of each of the support members **18** is engaged with the component surface **22** of the printed circuit **12**. In addition to the engagement with the component surface **22**, one or more of the support members **18** is optionally mechanically connected to the printed circuit **12** and/or the wall **38** of the housing **16**. In the exemplary embodiment, the support members **18** are each mechanically connected to the wall **38** of the housing **16** through the printed circuit **12**. Specifically, the wall **38** of the housing **16** includes a threaded opening **178** extending therethrough. A threaded fastener **160** extends through the opening **158** within the support member **18** and through an opening **182** within the printed circuit **12**. The threaded fastener **160** engages the threads **184** of the opening **178** to mechanically connect the support member **18** to the housing wall **38**. The threaded fastener **160** can also be seen in FIG. **10**. Optionally, the opening **178** of the housing wall **38** extends through an embossment **186** of the wall **38**. The embossment **186** may facilitate electrically isolating the housing wall **38** from the printed circuit **12**.

In addition or alternative to the opening **158**, the opening **178**, the opening **182**, and/or the threaded fastener **160**, one or more of the circuit faces **114** is optionally mechanically connected to the printed circuit **12** and/or the housing wall **38** using any other connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, one or more of the circuit faces **114** is engaged with the component surface **22** of the printed circuit **12** in alternative to the opening **158**, the opening **178**, the opening **182**, the threaded fastener **160**, and the other connection elements. In other words, in some embodiments the engagement between one or more of the circuit faces **114** and the component surface **22** is the only mechanical connection between the circuit face(s) **114** and the printed circuit **12** and/or the housing **16**.

FIG. **12** is a partially exploded perspective view of the connector assembly **10**. The housing face **116** of each of the support members **18** is engaged with the wall **40** of the housing **16**. In addition to the engagement with the housing wall

40, one or more of the support members **18** is optionally mechanically connected to the housing wall **40**. In the exemplary embodiment, the housing wall **40** includes one or more openings **188** extending therethrough. A threaded fastener **165** extends through each of the openings **188** within the housing wall **40** and into the opening **162** within the housing face **116** of the corresponding support member **18**. The threaded fastener **165** engages the threads **164** (FIGS. **7** and **8**) of the opening **162** to mechanically connect the support member **18** to the housing wall **40**.

In addition or alternative to the opening **162**, the opening **188**, and/or the threaded fastener **165**, one or more of the housing faces **116** is optionally mechanically connected to the housing wall **40** using any other connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, one or more of the housing faces **116** is engaged with the housing wall **40** in alternative to the opening **162**, the opening **188**, the threaded fastener **165**, and the other connection elements. In other words, in some embodiments the engagement between one or more of the housing faces **116** and the housing wall **40** is the only mechanical connection between the housing face(s) **116** and the housing **16**.

When engaged with the component surface **22** of the printed circuit **12** and the rear sides **50** of the electrical connectors **14**, the support members **18** support the printed circuit **12** and the electrical connectors **14** during mating of the electrical connectors **14** with a mating connector (not shown). The mechanical connections between the support members **18** and the housing **16**, the printed circuit **12**, and/or the electrical connectors **14** may facilitate increasing an amount of support provided by the support members **18** and/or may facilitate an overall rigidity of the connector assembly **10**, for example.

Although two are shown, the connector assembly **10** may include any number of the support members **18**, each for engagement with the rear side(s) **50** of any number of the electrical connectors **14**. Moreover, the connector assembly **10** may include any number of the electrical connectors **14**, each of which may or may not be engaged by any number of the support members **18**. In the exemplary embodiment, the electrical connectors **14** are mounted on the printed circuit **12** adjacent the mating edge **26** of the printed circuit **12**. But, one or more of the electrical connectors **14** may be mounted at any location along the component surface **22** of the printed circuit **12** other than along the mating edge **26**. The electrical connectors **14** shown and described herein are meant as exemplary only. The support members **18** may be used with any type of electrical connector that is mounted on a printed circuit.

FIG. **13** is a perspective view of an exemplary alternative embodiment of a support member **218**. FIG. **14** is another perspective view of the support member **218** viewed from a different angle than FIG. **13**. Referring now to FIGS. **13** and **14**, the support member **218** includes a body **310** having a connector face **312**, a circuit face **314**, a housing face **316**, a rear face **320**, and a plurality of gussets **317**. The gussets **317** extend outwardly from the rear face **320** and define portions of the circuit face **314**. Each gusset **317** also includes an intermediate face **318** and a rear face **321**. The intermediate faces **318** extend from the housing face **316** to the rear faces **321**, which extend between the intermediate faces **318** and the circuit face **314**. The connector face **312** is configured to engage the rear side **50** (FIGS. **2**, **9**, and **10**) of the electrical connector **14** (FIGS. **1**, **2**, **9**, and **10**), and the circuit face **314** is configured to engage the component surface **22** (FIGS. **1**, **9**, and **11**) of the printed circuit **12** (FIGS. **1**, **9**, and **11**).

The connector face **312** of the body **310** of the support member **218** includes one or more optional slots **350** for connection with the electrical connector **14**. The slots **350** define optional extension elements **352** therebetween. In the exemplary embodiment, each of the slots **350** and each of the extension elements **352** extend along an approximate entirety of the length (defined from the circuit face **314** to the housing face **316**) of the connector face **312**. Alternatively, one or more of the slots **350** and/or one or more of the extension elements **352** extends along only a portion of the length of the connector face **312**. In the exemplary embodiment, the slots **350** include a wedge shape. But, in addition or alternatively to the exemplary shapes shown and/or described herein, each of the slots **350** may include any other shape. Each of the extension elements **352** may also include any other shape than is shown and/or described herein. One or more of the slots **350** optionally includes a complementary shape relative to a corresponding one of the extension elements **85** (FIGS. **2**, **9**, and **10**) of the electrical connector **14**. Similarly, one or more of the extension elements **352** optionally includes a complementary shape relative to a corresponding one of the slots **84** (FIGS. **2**, **9**, and **10**) of the electrical connector **14**. The connector face **312** may include any number of the slots **350** and any number of the extension elements **352**.

Referring now to FIG. **13**, the intermediate faces **318** of the gussets **317** include an optional recess **354** extending therethrough. In some alternative embodiments, one or more of the recesses **354** extends through a portion of the corresponding rear face **321**. The recess **354** includes a bottom **356**. One or more of the gussets **317** includes one or more optional openings (not shown) that extend through the bottom **356** of the recess **354**, through the circuit face **314**, and completely through gusset **317** between the bottom **356** and the circuit face **314**. The opening is configured to receive a fastener (such as, but not limited to, the fastener **160** shown in FIGS. **10** and **11**) therethrough for connecting the support member **218** to the wall **38** (FIGS. **1** and **11**) of the housing **16** (FIGS. **1**, **9**, **11**, and **12**) of the electrical connector **14**. Optionally, one or more of the gussets **317** of the support member **218** does not include the recess **354** and the opening extends through the corresponding intermediate face **318**.

The support member **218** includes one or more optional openings **362** that extend through the housing face **316** and into a portion of the body **310**. In the exemplary embodiment, the opening **362** includes a thread **364** for connection to the housing **16** using a threaded fastener (such as, but not limited to, the fastener **165** shown in FIG. **12**). In some alternative embodiments, the opening **362** extends completely through the body **310** for connecting the support member **218** to the wall **38** of the housing **16** using a fastener (not shown) that extends through the opening **362**. The connection between the support member **218** and the wall **38** of the housing **16** using the opening **362** may be an additional or alternative connection to any connection between the support member **218** and the wall **38** described and/or illustrated herein, such as, but not limited to, the connection between the support member **218** and the wall **38** using the openings that extend through the gussets **317**. Although three openings **362** are shown, the support member **218** may include any number of the openings **362**.

In addition or alternatively to the exemplary sizes and shapes shown and/or described herein, the body **310** of the support member **218** may include any other shapes that enable the body **310** to engage both the component surface **22** of the printed circuit **12** and the rear side **50** of the electrical connector **14**. For example, in the exemplary embodiment, the connector face **312** and the circuit face **314** extend

approximately perpendicular to each other. Alternatively, the connector face **312** and the circuit face **314** may extend at any other angle than approximately perpendicular relative to each other. The housing face **316** extends approximately perpendicular to the connector face **312** and approximately parallel to the circuit face **314** in the exemplary embodiment. But, the housing face **316** may extend at any other angle than approximately perpendicular relative to the connector face **312**; and the housing face **316** may extend at any other angle than approximately parallel relative to the circuit face **314**. Although the rear face **320** is shown as extending approximately perpendicular to the circuit face **314** and the housing face **316**, the rear face **320** may extend at any other angle than approximately perpendicular relative to the circuit face **314** and/or the housing face **316**. Moreover, and for example, the rear face **320** may extend at any other angle than approximately parallel relative to the connector face **312**.

In the exemplary embodiment, the rear faces **321** of the gussets **317** extend approximately perpendicular to the circuit face **314** and the housing face **316**, and extend approximately parallel to the connector face **312**. But, each of the rear faces **321** may extend at any other angle than approximately perpendicular relative to the circuit face **314** and/or the housing face **316**. Moreover, and for example, each of the rear faces **321** may extend at any other angle than approximately parallel relative to the connector face **312**. In the exemplary embodiment, the intermediate faces **318** of the gussets **317** extend at an approximately 135° angle relative to the housing face **316** and the rear face **320**, and thus extend at an approximately 45° angle relative to the connector face **312** and the circuit face **314**. But, each of the intermediate faces **318** may extend at any other angle than approximately 135° relative to the housing face **316** and/or the rear face **320**; and each of the intermediate faces **318** may extend at any other angle than approximately 45° relative to the connector face **312** and/or the circuit face **314**. In some alternative embodiments, the housing face **316** intersects one or more of the rear faces **121**. For example, the body **310** of the support member **218** optionally does not include the intermediate face **318** of one or more of the gussets **317**, or both the housing face **316** and the intermediate face **318** of one or more of the gussets **317** intersect the corresponding rear face **121**. In some alternative embodiments, one or more of the gussets **317** optionally does not include the rear face **121** and the circuit face **114** intersects the corresponding intermediate face **318** and/or the housing face **316**.

In addition or alternative to the reception of the extension elements **85** and **352** within the respective slots **350** and **84**, the connector face **312** is optionally mechanically connected to the rear side(s) **50** using any connection element (not shown), such as, but not limited to, an adhesive, a threaded fastener, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, the connector face **312** is engaged with the rear side(s) **50** in alternative to the slots **84** and **350**, the extension elements **85** and **352**, and the connection elements. In other words, in some embodiments the engagement between the connector face **312** and the rear side(s) **50** of the electrical connector(s) **14** is the only mechanical connection between the connector face **312** and the rear side(s) **50** of the electrical connector(s) **14**. In addition or alternative to one or more of the openings within the gussets **317**, one or more of the openings **178**, one or more of the openings **182**, and/or one or more of the threaded fasteners **160**, the circuit face **314** is optionally mechanically connected to the printed circuit **12** and/or the housing wall **38** using any other connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, the circuit face **314** is engaged with the component surface **22** of the printed circuit **12** in alternative to the openings within the gussets **317**, the openings **178**, the openings **182**, the threaded fasteners **160**, and the other connection elements. In other words, in some embodiments the engagement between the circuit face **314** and the component surface **22** is the only mechanical connection between the circuit face **314** and the printed circuit **12** and/or the housing **16**. In addition or alternative to one or more of the openings **362**, one or more of the openings **188**, and/or one or more of the threaded fasteners **165**, the housing face **316** is optionally mechanically connected to the housing wall **40** using any other connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, the housing face **316** is engaged with the housing wall **40** in alternative to the openings **362**, the openings **188**, the threaded fasteners **165**, and the other connection elements. In other words, in some embodiments the engagement between the housing face **316** and the housing wall **40** is the only mechanical connection between the housing face **316** and the housing **16**.

The body **310** of the support member **218** may be fabricated from any materials. In the exemplary embodiment, the body **310** is fabricated from one or more dielectric materials, such as, but not limited to, a plastic, a polymer, and/or the like. In addition or alternatively, the body **310** may be fabricated from one or more electrically conductive materials and/or may include one or more electrical conductors thereon and/or therein. For example, in some alternative embodiments, the body **310** and/or one or more electrical conductors on and/or within the body **310** may provide an electrical connection between one or more of the electrical connectors **14** and the printed circuit **12**.

Although three are shown, the body **310** of the support member **218** may include any number of the gussets **317**. In some embodiments, the body **310** of the support member **218** does not include any of the gussets **317**. For example, FIG. **15** is a perspective view of an exemplary alternative embodiment of a support member **418**. The support member **418** includes a body **510** having a connector face **512**, a circuit face **514**, a housing face **516**, and a rear face **520**. The connector face **512** is configured to engage the rear side **50** (FIGS. **2**, **9**, and **10**) of the electrical connector **14** (FIGS. **1**, **2**, **9**, and **10**), and the circuit face **514** is configured to engage the component surface **22** (FIGS. **1**, **9**, and **11**) of the printed circuit **12** (FIGS. **1**, **9**, and **11**).

The connector face **512** of the body **510** of the support member **418** includes one or more optional slots **550** for connection with the electrical connector **14**. The slots **550** define optional extension elements **552** therebetween. In the exemplary embodiment, each of the slots **550** and each of the extension elements **552** extend along an approximate entirety of the length (defined from the circuit face **514** to the housing face **516**) of the connector face **512**. Alternatively, one or more of the slots **550** and/or one or more of the extension elements **552** extends along only a portion of the length of the connector face **512**. In the exemplary embodiment, the slots **550** include a wedge shape. But, in addition or alternatively to the exemplary shapes shown and/or described herein, each of the slots **550** may include any other shape. Each of the extension elements **552** may also include any other shape than is shown and/or described herein. One or more of the slots **550** optionally includes a complementary shape relative to a corresponding one of the extension elements **85** (FIGS. **2**, **9**, and **10**) of the electrical connector **14**. Similarly, one or more of the extension elements **552** optionally includes a complementary shape relative to a corresponding one of the slots **84**

(FIGS. **2**, **9**, and **10**) of the electrical connector **14**. The connector face **512** may include any number of the slots **550** and any number of the extension elements **552**.

The support member **418** includes one or more optional openings **562** that extend through the housing face **516** and into a portion of the body **510**. In the exemplary embodiment, the opening **562** includes a thread **564** for connection to the housing **16** using a threaded fastener (such as, but not limited to, the fastener **165** shown in FIG. **12**). In some alternative embodiments, the opening **562** extends completely through the body **510** for connecting the support member **418** to the wall **38** (FIGS. **1** and **11**) of the housing **16** using a fastener (not shown) that extends through the opening **562**. Although three openings **362** are shown, the support member **218** may include any number of the openings **362**.

In addition or alternatively to the exemplary sizes and shapes shown and/or described herein, the body **510** of the support member **418** may include any other shapes that enable the body **510** to engage both the component surface **22** of the printed circuit **12** and the rear side **50** of the electrical connector **14**. For example, in the exemplary embodiment, the connector face **512** and the circuit face **514** extend approximately perpendicular to each other. Alternatively, the connector face **512** and the circuit face **514** may extend at any other angle than approximately perpendicular relative to each other. The housing face **516** extends approximately perpendicular to the connector face **512** and approximately parallel to the circuit face **514** in the exemplary embodiment. But, the housing face **516** may extend at any other angle than approximately perpendicular relative to the connector face **512**; and the housing face **516** may extend at any other angle than approximately parallel relative to the circuit face **514**. Although the rear face **520** is shown as extending approximately perpendicular to the circuit face **514** and the housing face **516**, the rear face **520** may extend at any other angle than approximately perpendicular relative to the circuit face **514** and/or the housing face **516**. Moreover, and for example, the rear face **520** may extend at any other angle than approximately parallel relative to the connector face **512**.

In addition or alternative to the reception of the extension elements **85** and **552** within the respective slots **550** and **84**, the connector face **512** is optionally mechanically connected to the rear side(s) **50** using any connection element (not shown), such as, but not limited to, an adhesive, a threaded fastener, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, the connector face **512** is engaged with the rear side(s) **50** in alternative to the slots **84** and **550**, the extension elements **85** and **552**, and the connection elements. In other words, in some embodiments the engagement between the connector face **512** and the rear side(s) **50** of the electrical connector(s) **14** is the only mechanical connection between the connector face **512** and the rear side(s) **50** of the electrical connector(s) **14**. The circuit face **514** is optionally mechanically connected to the printed circuit **12** and/or the housing wall **38** using any connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a threaded fastener, a snap-fit, and/or the like. In some embodiments the engagement between the circuit face **514** and the component surface **22** is the only mechanical connection between the circuit face **514** and the printed circuit **12** and/or the housing **16**. In addition or alternative to one or more of the openings **562**, one or more of the openings **188**, and/or one or more of the threaded fasteners **165**, the housing face **516** is optionally mechanically connected to the housing wall **40** using any other connection element (not shown), such as, but not limited to, an adhesive, a non-threaded fastener, a snap-fit, and/or the like. In some embodiments, the housing face **516** is engaged with the housing wall **40** in alternative to the openings **562**, the openings **188**, the threaded fasteners **165**, and the other connection elements. In other words, in some embodiments the engagement between the housing face **516** and the housing wall **40** is the only mechanical connection between the housing face **516** and the housing **16**.

The body **510** of the support member **418** may be fabricated from any materials. In the exemplary embodiment, the body **510** is fabricated from one or more dielectric materials, such as, but not limited to, a plastic, a polymer, and/or the like. In addition or alternatively, the body **510** may be fabricated from one or more electrically conductive materials and/or may include one or more electrical conductors thereon and/or therein. For example, in some alternative embodiments, the body **510** and/or one or more electrical conductors on and/or within the body **510** may provide an electrical connection between one or more of the electrical connectors **14** and the printed circuit **12**.

The embodiments described and/or illustrated herein may provide a support member that facilitates reducing an amount a printed circuit flexes and/or an amount of stress applied to a printed circuit during mating with a mating connector. The embodiments described and/or illustrated herein may provide a support member that occupies less space within a mating area of a connector assembly than at least some known support members. The embodiments described and/or illustrated herein may provide a connector assembly having an increased number and/or size of electrical connectors mounted on a printed circuit. The embodiments described and/or illustrated herein may provide a support member that facilitate preventing an electrical connector from being electrically disconnected from a printed circuit.

It is to be understood that the above description and the figures are intended to be illustrative, and not restrictive. For example, the above-described and/or illustrated embodiments (and/or aspects thereof) may be used in combination with each other. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the subject matter described and/or illustrated herein without departing from its scope. Dimensions, types of materials, orientations of the various components (including the terms "upper", "lower", "vertical", and "lateral"), and the number and positions of the various components described herein are intended to define parameters of certain embodiments, and are by no means limiting and are merely exemplary embodiments. Many other embodiments and modifications within the spirit and scope of the claims will be apparent to those of skill in the art upon reviewing the above description and the figures. The scope of the subject matter described and/or illustrated herein should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein." Moreover, in the following claims, the terms "first," "second," and "third," etc. are used merely as labels, and are not intended to impose numerical requirements on their objects. Further, the limitations of the following claims are not written in means—plus-function format and are not intended to be interpreted based on 35 U.S.C. §112, sixth paragraph, unless and until such claim limitations expressly use the phrase "means for" followed by a statement of function void of further structure.

What is claimed is:

1. A connector assembly comprising:

a printed circuit having a component surface and a bottom surface that is opposite the component surface;

a housing having a wall extending along the bottom surface of the printed circuit;

an electrical connector having a bottom side mounted on the component surface of the printed circuit, the electrical connector extending a length from a mating face to a rear side that is opposite the mating face, the electrical connector being configured to mate with a mating connector at the mating face; and

a support member comprising a body having a connector face and a circuit face, the support member positioned such that the connector face engages the rear side of the electrical connector and the circuit face engages the component surface of the printed circuit to support the electrical connector on the printed circuit, wherein the support member is mechanically connected through the printed circuit to the wall of the housing.

2. The assembly according to claim **1**, wherein the rear side of the electrical connector comprises a slot extending upward from the printed circuit, the connector face of the support member comprising an extension element slidably received within the slot of the rear side of the electrical connector.

3. The assembly according to claim **1**, wherein the housing has another wall covering at least a portion of the component surface of the printed circuit, the support member comprising a housing face extending from at least one of the connector face and the circuit face, the support member being mechanically connected to the other wall of the housing at the housing face.

4. The assembly according to claim **1**, wherein the rear side of the electrical connector comprises a slot, the connector face of the support member comprising a wedge element received within the slot of the rear side of the electrical connector.

5. The assembly according to claim **1**, wherein the body of the support member comprises an opening extending therethrough, the assembly further comprising a fastener received within the opening and extending through the printed circuit.

6. The assembly according to claim **1**, wherein the body of the support member comprises an opening extending therethrough, the assembly further comprising a fastener received within the opening and engaged with the housing.

7. The assembly according to claim **1**, wherein the circuit face of the support member extends approximately perpendicular to the connector face.

8. The assembly according to claim **1**, wherein the housing is an assembly housing and the electrical connector comprises a connector housing and contact modules held by the connector housing, the contact modules defining at least a portion of the bottom side of the electrical connector.

9. The assembly according to claim **1**, wherein the mating face of the electrical connector extends approximately perpendicular to the component surface of the printed circuit.

10. A connector assembly comprising:

a printed circuit having a component surface;

an electrical connector having a bottom side mounted on the component surface of the printed circuit, the electrical connector extending a length from a mating face to a rear side that is opposite the mating face, the electrical connector being configured to mate with a mating connector at the mating face, wherein the electrical connector comprises a housing and contact modules held by the housing, the contact modules defining at least a portion of the rear side of the electrical connector, the rear side of the electrical connector comprising a wedge-shaped slot defined by two adjacent contact modules; and

a support member comprising a body having a connector face and a circuit face, the support member positioned such that the connector face engages the rear side of the electrical connector and the circuit face engages the component surface of the printed circuit to support the electrical connector on the printed circuit, the connector face of the support member comprising an extension received within the slot of the electrical connector.

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